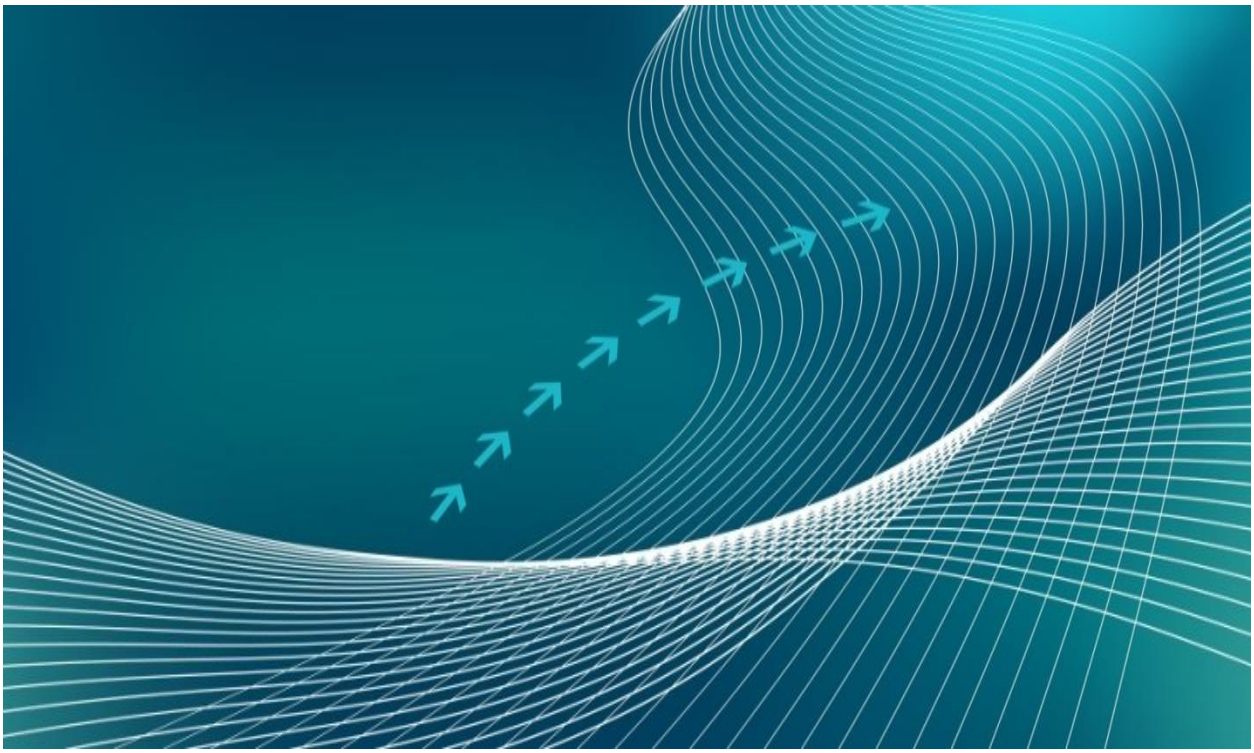

REGULATORY ANALYSIS OF RI STATE FIRE SAFETY CODES

Fire Safety Code Board of Appeal and Review

Fire Safety Code Board of Review

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Introduction and Executive Summary

The Rhode Island Fire Safety Code Board of Appeal and Review (RIFSCBAR), pursuant to R.I. General Laws 23-28.3, has the statutory authority to promulgate and amend rules and regulations related to the state fire safety codes. The current fire safety codes are filed with the Rhode Island Secretary of State's office. Each of the RI State Fire Safety Codes includes:

- An underlying base code incorporated by reference, from the National Fire Protection Association (NFPA); the Fire Code, the Life Safety Code and the National Fire Alarm and Signaling Code; and
- Rhode Island-specific amendments to that base code; developed by the RIFSCBAR.

The RIFSCBAR is proposing changes to the Rhode Island State Fire Safety Code Regulations. These changes include updating the base code to a newer version of the national base code—updating from the NFPA 2015 family of model codes to the NFPA 2018 model codes. RIFSCBAR also proposes RI-specific amendments that change the base code to better align with the specific needs of Rhode Island.

The following economic analysis will explain the process of regulatory development and the potential impacts that these regulations will have on Rhode Islanders. Those impacts include:

- Safety, health, livability, and environmental impacts related to increased protective requirements;
- Building resiliency impacts related to increased protection from fires;
- Construction cost impacts related to the cost of construction and compliance with the state fire safety code requirements; and,
- Procedural and administrative impacts related to the management and application of the code requirements.

The Rhode Island Fire Safety Code Board of Appeal and Review reviewed the significant changes to the Rhode Island State Fire Safety Codes in both the updated incorporated model codes and the newly proposed Rhode Island-specific amendments and conducted the following regulatory analysis. This report includes the following sections:

- An overview of the regulatory development process,
- an overview of the significant revisions to the Rhode Island Fire Safety Codes,
- An overview of the RI-specific changes to the Rhode Island Fire Safety Codes,
- An economic analysis that reviews the impacts of a selection of the changes to the codes, and
- Appendices that includes a list of the significant changes and information about those changes.

This analysis estimates the annual construction cost impact related to the change to the provisions in the state fire safety codes to be $550 thousand, for a 3-year net present value of $2 million. These costs are offset by significant health, safety and building resiliency benefits.

Health, Safety, Building Resiliency Benefits

Currently used in every U.S. state, and adopted statewide in 43 states, the NFPA Fire and Life Safety Codes' main objective is not building resiliency, which is an added benefit, but rather to minimize danger to life to occupants, first responders and the general public. The codes do so by incorporating fire protection

requirements into the construction of buildings, as well as occupancy features, that minimize the costly effects of fire and fire-related hazards, including smoke, heat and toxic gases.

While adopting new fire codes is oftentimes associated with an increase in the cost of construction, the significant benefits associated with the latest codes, dependent on the contingency of future catastrophic events, can be difficult to monetize.

Protecting Life

At the federal level, not all proposed rules are required to pass a cost-benefit analysis to be promulgated; particularly those which will not have a significant economic impact on a substantial number of small entities, as certified by the agency head, or those promulgated by independent regulatory agencies. However, a proposed rule has a much better chance of going into effect if the agency can prove that the benefits of the policy outweigh the costs.

Value of Statistical Life (VSL) estimates play an important role in determining the benefit vs. cost of a regulation. When the VSL is used in a regulatory analysis, it is a valuable benchmark in offsetting the anticipated costs of the regulation. VSL estimates represent how much individuals are willing to pay for a very small reduction in the probability of death, paid for by forgoing the consumption of other goods and services. For example, if a regulation reduced the risk of death by 0.00001 per person, then it would take 100,000 people to accumulate a collective risk reduction of one "statistical life". If, on average, everyone is willing to pay $100 per year to reduce the probability of dying by 0.00001, then collectively the group would be willing-to-pay $10 million per year to prevent the loss of one "statistical life". This is the value of a statistical life. Over time, as wages and the public's willingness to pay for safety measures have grown, so has the VSL. The Environmental Protection Agency fixes the VSL at about $10 million. Although the Office of Management and Budget hasn't set a government-wide VSL, for purposes of cost-benefit analyses on proposed regulations, it has generally endorsed agency VSLs as high as that.

Considering a VSL pegged at $10 million, the monetary benefit from potential deaths prevented, had these proposed fire codes been in effect in Rhode Island on Feb 20th, 2003, is staggering. That day, a fire broke out killing 100 people and injuring 230 others, at the Station Nightclub, in West Warwick, RI.

Violations of existing fire codes contributed to the catastrophe. However, the lack of more robust passive fire code protections particularly as relate to "assembly occupancies" & pyrotechnics, contributed as well. As a result, within weeks of the disaster, the NFPA committee handling those occupancies began the work to strengthen fire code protections with the goal of preventing future calamities. Based upon the committee's work, in July 2003, Tentative Interim Amendments (TIAs) were issued for the NFPA's Life Safety Code. These TIAs required automatic fire sprinklers in all new and existing nightclubs and similar locations that accommodate more than 100 occupants. The TIAs also required, among other things, additional crowd manager personnel. The TIAs were subsequently incorporated into the 2006 edition of the Life Safety Code, along with additional exit requirements for new nightclub occupancies.

No one can possibly know with certainty how many lives would have been saved at the Station Nightclub, if the proposed fire codes were regulation in 2003. Furthermore, the RIFSCBAR is not performing a regulatory analysis on the proposed code by using 2003's code as the base for comparison. However, the

thought that potentially $1 billion, in loss of statistical life alone, could have been avoided with a more robust fire code in place, is shocking.

In fact, monetary damage to structures caused by fire, aside, if over a three-year period, just 0.2 statistical lives are saved because of the adoption of these proposed fire codes, the monetary benefit of their adoption would be equal to the cost.

Insurance Industry

The insurance industry places a significant importance on fire codes. The strength of fire codes in a state (or city, if adopted at that level) is carefully examined by the insurance industry and factors into each insurer's decision on whether to write in a state and the premium to charge individual insureds. To help establish appropriate fire insurance premiums for residential and commercial properties, insurance companies need reliable, up-to-date information about a community's fire-protection services. The Insurance Services Office (ISO) provides that information through the Public Protection Classification (PPC) program. ISO collects information on municipal fire-protection efforts, which includes fire code information, in communities throughout the United States. In each of those communities, ISO analyzes the relevant data using a Fire Suppression Rating Schedule (FSRS). ISO then assigns a Public Protection Classification from 1 to 10. Class 1 generally represents superior property fire protection, and Class 10 indicates that the area's fire-suppression program doesn't meet ISO's minimum criteria. By classifying communities' ability to suppress fires, ISO helps the communities secure lower fire insurance premiums.

Adoption of these amendments will have a beneficial effect on the PPC score which in turn will have an effect on insurance premiums and availability of insurance in Rhode Island.

Natural Disasters in the US

There is little doubt that 2020 will be remembered as the year of the great Coronavirus Pandemic. All other events were overshadowed by the virus. Nonetheless, a record number of natural disasters struck the United States in 2020, including wildfires, hurricanes, drought, and floods. In 2020 alone, the National Oceanic and Atmospheric Administration (NOAA) reported 16 weather and climate disasters that caused over $1 billion in damage, on top of the immeasurable loss of lives (see Resources section at the end of this report).

However, 2020 is not an outlier; the last few years has seen an increase in both severity and frequency of natural disasters, in addition to a greater number of people living in high risk areas. In the US alone, from 1980 to date, losses from natural disasters exceed $1.6 trillion (Resource number 2).

This degree of loss is not inevitable. The Federal Emergency Management Agency (FEMA) conducted a study that found that robust building codes greatly reduce damage from flooding, earthquakes and hurricane-scale winds.

In that same token, robust fire codes help protect structures, occupants, firefighters and first responders from fires, whether wildfires or a result of negligence or arson. Furthermore, fires oftentimes follow disasters; earthquakes, tornados, thunderstorms, floods, hurricanes & blasts. Structures build using the latest fire codes are less likely to sustain devastating fire-related damage, following such disasters—whether natural or man-made.

Regulatory Development Process

Each state's code development process varies—some states implement a mandatory statewide code, some leave code development to local governments, and some use a mixed approach.[1] In any case, a jurisdiction will not 'start from scratch' and create its own fire code; rather, a jurisdiction will adopt a base code from a national or international organization to use for the vast majority of provisions, and will make revisions to specific provisions as it deems necessary. Using a base code allows jurisdictions to leverage the expertise of national and international code development organizations and makes compliance easier for design professionals and builders by keeping codes relatively standardized across jurisdictions.

The proposed revision to the Rhode Island State Fire Safety Codes update the incorporated versions of the relevant model codes from the National Fire Protection (NFPA) 2015 editions to the 2018 editions, as well as updated versions of numerous reference codes. Additionally, Rhode Island-specific amendments to this base code are developed by RIFSCBAR during the review process and adopted by the regulations.

RI Fire Codes: Current and Proposed Model Codes			
Reg.	**Title**	**Current Model Code**	**Proposed Model Code**
450-RICR-00-00-7	RI Fire Code	2015 NFPA-1	2018 NFPA-1
450-RICR-00-00-8	RI Life Safety Code	2015 NFPA-101	2018 NFPA-101
450-RICR-00-00-10	RI Fire Alarm Code	2013 NFPA-72	2019 NFPA-72

This analysis is based on several factors, recognizing that each and every property is site-specific and that conditions affecting one property cannot be assimilated to any other property. These factors include:

- Classification of occupancy
- Number of stories
- Type of building construction
- Year constructed
- Maximum occupant load
- Size of building footprint and gross square feet per floor
- Hazard of contents
- Fire protection features
- Actual use of the property vs. 'legal use'
- Site water supply and fire department access
- Plan of action selected and adopted by the property owner - by far the most significant driving force

[1] http://opim.wharton.upenn.edu/risk/library/WP201601_Simmons-Czajkowski-Done_Effectiveness-of-Florida-Building-Code.pdf

Model Code Development

For fire safety codes, Rhode Island uses some version of the NFPA-1/NFPA-101 codes developed by the National Fire Protection Association. The NFPA processes attempt to balance health and safety goals with cost effectiveness and industry best practices and utilizes a mixture of design and performance standards.

The NFPA generally revises model codes on a three-year cycle. These code revision processes invite public input and public comment to inform NFPA technical committees, which eventually leads the standards council to issue the new standards. A wide variety of interests—such as enforcers, consumers, regulators, builders, contractors, design professionals, trade associations, manufacturers, standard developing organizations, academia, research and testing labs, and other groups—provide input regarding revisions, which are reviewed by technical committees and adapted into draft standards. These committees gather proposed code changes, consider alternatives, conduct meetings, gather public comment on the proposed changes, prepare further revisions, and eventually publishes the new edition of the model code.[2]

Jurisdictions considering updating their code to reflect a recently published model or national code must weigh the advantages and disadvantages of doing so. Some states will choose to keep using an older model code, often citing the additional costs that are related to the incremental increases in the stringency of new model code provisions. Alternatively, the benefits of updating Rhode Island's code on a three-year cycle to adopt the most recent model code include:

- Keeping the code aligned with advancements in building science and material technology;
- Adapting the codes to reflect causes, effects and responses to nation or international major fire and/or loss-of-life events;
- Improving the building quality of construction in the state lifetime through long-term value additions related to construction resiliency and energy-savings improvements;
- Securing additional health, safety, and livability improvements for Rhode Islanders; and
- Easing compliance through procedural and administrative changes and remaining in alignment with other jurisdictions that use more recent model codes.
- Avoiding conflict with other State-adopted codes, i.e. State Fire Safety Code, which share many of the same referenced documents

Rhode Island Amendments

The Rhode Island Fire Safety Code Board of Appeal and Review uses the following process to review and recommend the adoption of national model codes and standards, with the overarching goal of promoting public safety. When the national model codes (prepared by the National Fire Protection Association) update or modify industry recognized standards, the Rules and Regulations Subcommittee of the RIFSCBAR receives and reviews those documents to evaluate the appropriateness of incorporation into the Rhode Island family of codes. This subcommittee includes representatives from the Rhode Island Association of Fire Chiefs, Rhode Island Association of Fire Marshals and the Fire Communications Officers Association of Rhode Island.

The numerous meetings of the subcommittee are held in an open forum with input solicited from the public and various interested stakeholders including the Rhode Island Builders Association, Rhode Island

[2] https://www.nfpa.org/Codes-and-Standards/Standards-development-process/How-the-process-works

Historical Preservation & Heritage Commission, Governor's Commission on Disabilities, Grow Smart Rhode Island, Rhode Island League of Cities and Towns and the Providence Foundation. The subcommittee reviews every modification to the national publications, evaluating life safety, construction practicality, and its effect on the local industry. The subcommittee also consider alternative courses of action, and if necessary, prepare RI-specific amendments to the fire safety codes. Once the review process of the subcommittee is completed, recommendations are forwarded to the full RIFSCBAR for review and approval to begin the rulemaking process. Upon concurrence, the RIFSCBAR, in accordance with RI regulatory adoption procedures, schedules the necessary internal reviews, public notices and hearings, and adoption of regulations.

Significant Revisions to the Fire Codes

Explanation of Significant Changes and Themes

Traffic Signal Pre-emption

Many fire departments have deployed traffic signal pre-emption systems. These systems reduce the risk of accidents in intersections during emergency responses and improve response times to both emergency and nonemergency incidents. As new traffic signals are installed or existing traffic signal equipment is replaced, it is important that traffic signal pre-emption be provided as part of the new or replacement equipment. AHJs (Authority Having Jurisdiction) should be aware of what type of pre-emption technology is being utilized in their jurisdiction and adjacent jurisdictions. Coordination with the jurisdiction's traffic engineers is important to ensure that the AHJ is specifying the appropriate traffic signal equipment compatible with the equipment on fire apparatus.[3]

Marijuana Growing, Processing or Extraction Facilities

Chapter 38 is new to the 2018 edition of the Code. It was developed in response to a request from jurisdictions that are seeing an increase in facilities processing marijuana; for growing, harvesting, or extracting tetrahydrocannabinol (THC) oils from the plant to use in other marijuana-based products. Over the past few years, the number of states that recognize the legal use of marijuana, on either a medical or recreational level, has increased. As a result, more facilities, either newly constructed or moving into existing buildings, are being used for marijuana production. Prior to Chapter 38, no NFPA code or standard addressed the hazards specific to marijuana production facilities. This new chapter addresses the hazards unique to these types of facilities and processes while also recognizing other necessary fire protection measures address elsewhere in the Code. It is not intended to create a new occupancy; rather, it highlights those requirements necessary for fire inspectors to help ensure the safety of building occupants, property protection, and firefighter safety where the growing or processing of marijuana occurs.[4]

Significant Revisions to the Life Safety Codes

Wall Marking and Identification

Paragraph 8.2.2.5 is new to the 2018 edition of the Code. This paragraph is intended to provide guidance to persons doing work above a ceiling or other concealed area within a floor or ceiling who may have

[3] NFPA 1, Fire Code Handbook, 2018, p. 581 [commentary].
[4] NFPA 1, Fire Code Handbook, 2018, p. 777 [commentary].

difficulty identifying fire barriers, smoke barriers, or smoke partitions from those walls that are not constructed as such.

Past editions of the Code have attempted to include provisions to mandate marking or identification for all fire barriers, smoke barriers, and smoke partitions, but there were always too many questions centered on the enforcement of the requirement as well as ambiguity in the requirements. This provision limits the requirement of identifying these barriers only to the areas within accessible concealed floor, floor/ceiling, or attic spaces as those are areas with a high chance of violating the integrity of these barriers. The requirement is also limited to new construction to not place an undue burden on existing facilities. Further, this paragraph can be used as guidance on how to identify these barriers in existing constructions as best practice to help maintain the integrity intended for fire barriers, smoke barriers, and smoke partitions.[5]

RI-Specific Changes to Fire Codes and Life Safety Codes

The table in Appendix 1 provides an overview of the identified significant revisions as a result of updating the above codes.

RI-specific Blanket Variance to Life Safety Code

Chapter 24 of the Rhode Island Life Safety Code (RILSC) provides that "[o]ne- and two-family dwellings shall be limited to buildings containing not more than two dwelling units in which each dwelling unit is occupied by members of a **single family** with not more than three outsiders, if any, accommodated in rented rooms."

However, the Authorities Having Jurisdiction (AHJs) throughout the State are reporting a growing trend in the utilization of what would traditionally be considered a single-family dwelling structure as a residence for groups of unrelated persons in a family-like setting, i.e. so-called "sober houses".

The Board finds that in order to address the need for these non-traditional living arrangements, and because certain relief may be warranted due to unanticipated and unreasonable hardship upon the general public, and that such relief does not conflict with the general objectives of the RILSC, that these non-traditional living facilities should remain within the jurisdiction of Chapter 26, Lodging or Rooming Houses, and yet be afforded some degree of relief from the so-called traditional requirements in cases where the functional equivalent of a traditional family unit can be demonstrated.

Regulatory Impact Analysis

The Rhode Island state fire safety codes are some of the largest and most significant regulations in the state and have far-reaching impacts. These impacts include:

- Safety, Health, livability, and environmental impacts related to increased protective requirements;
- Building resiliency impacts related to more fire-protective construction;
- Construction cost impacts related to the cost of construction and compliance with the state fire code requirements;

[5] NFPA 101, Life Safety Code Handbook, 2018, p. 311 [commentary].

- Procedural and administrative impacts related to the management and application of the code requirements

Impacted Stakeholders

State & Local Government

The proposed changes to the fire codes will alter the standards that state and local government fire code and inspection offices enforce through building inspections, plan review, and permitting activities. This will require these offices to become familiar with the changes to the model codes as well as the changes to the Rhode Island amendments.

Builders and Construction Industry

Some of the proposed changes will have an impact on developers—in some cases adding costs, and in some cases savings. In many cases, depending on the market, developers may pass any additional costs on to their customers, the property owners.

Homeowners, Property Owners, and Business Owners

Additional costs or savings created by the revised fire code provisions may change the prices charged to property owners. The benefits associated with the proposed code revisions—such as increased safety, building resiliency, and lower insurance premiums—are benefits to the end-users of the buildings.

Neighboring States

Rhode Island's neighbors use the following model codes, when they use a specific code:

Code	Connecticut	Massachusetts
Fire Code	NFPA 1-2015	NFPA 1-2015
Life Safety Code	NFPA 101-2015	NFPA 101-2015

In Connecticut, the current edition of the fire safety codes became effective on October 1st, 2018.[6] Massachusetts adopted the current edition of the fire safety codes on January 1st, 2018.[7] The NFPA maintain lists of Code Adoptions by state.[8]

Methodology—Common to both Building and Fire Codes

The Fire Safety Code Board of Appeal and Review and Building Code Standards Committee, in consultation with the Office of Regulatory Reform and external consultants and advisers, developed a methodology to identify, explain, and estimate the impact of proposed revisions to the fire and building codes.

[6] https://portal.ct.gov/DAS/Office-of-State-Fire-Marshal/CT-Fire-Safety-and-Prevention-Codes
[7] https://www.mass.gov/service-details/massachusetts-fire-code
[8] See NFPA CodeFinder tool at https://codefinder.nfpa.org/ and ICC list at https://www.iccsafe.org/wp-content/uploads/Master-I-Code-Adoption-Chart-May-Update.pdf

Identification and Explanation of Code Changes

Each change in the building and fires codes that was identified as a significant revision was included in an explanatory table, provided as Appendix 1 of this report. This table includes the following information, where appropriate, for each change that was identified:

Descriptive Information

- Code citation
- description
- current code language
- proposed code language
- a brief description of the difference between the current and proposed code
- background information, reasoning, and/or justification for significant proposed code revisions

Cost

- whether the code change is likely to lead to an increase or decrease in construction costs (if applicable)
- The prototype, cost per prototype, and cost per square-foot of development
- The frequency (high, medium, low, or rare) of this provision applying to a project in each of following categories:
    - Residential- Basic
    - Residential- Specialty
    - Commercial- Basic
    - Commercial- Specialty
- An estimated statewide construction cost impact

Categorization

- Identification of up to five benefits/categorizations associated with the code change from the following list:
    - Safety
    - Building Resiliency
    - Cost Savings
    - Health/Livability
    - Energy/Environmental Savings
    - Flexibility
    - Increase Permissiveness
    - New Materials/Technology
    - Administrative/Procedural
    - Technical
- Whether the code revision is a significant change
- Whether the change falls within one of the following revision themes that was identified across the codes:
    - Alarm/Detector/Monitor Systems
    - Sprinkler Systems

- Restaurant-Related Provisions

Cost Estimation

Cost estimates were generated for provision changes, when deemed possible and appropriate. The cost estimation process includes three primary calculations: the percentage increase in construction costs, the frequency/prevalence of the code change, and the impact on overall Rhode Island construction output. An example of the calculation of a code revision is provided below.

Percentage Increase in Construction Costs

Most of the code provisions analyzed in this report make incremental changes to specific provisions in the code. For any given provision or requirement that has been altered in some form, this analysis estimates costs by looking at the marginal difference between the current cost of the provision and the estimated cost were the change to be adopted. The cost estimates should not be taken to represent the cost of the provision in totality, because, for the purpose of this analysis, the costs associated with the current code language are fixed.

To generate these incremental percentage changes, the RIFSBAR based their estimates on material provided by subject matter experts on the board to understand the change in construction costs associated with the proposed revisions to the code. Prototype projects were used to provide structure to the estimation of code impacts around a typical example of a project where the code revision would lead to construction cost differences.

For example, suppose a (hypothetical) revision to the code now requires a special outlet (that offers increased electrical fire prevention) to be installed in two common home locations that typically do not have such outlets. Cost estimators would use an example prototype project of a 2,000 square foot home to determine the cost impact per home of these two new outlets. Since the wiring, outlets, and labor would be installed regardless of the code change, the incremental cost difference would be the difference between the two new outlets vs. two regular outlets. Using an example cost difference of $4, the cost of two additional outlets is $8 per 2,000 square foot home, or $0.004 per square foot.

To determine the percentage increase in the cost of development per square foot, the cost estimates per square foot were divided by the average cost of development per square foot. These estimates were based on values from valuation tables published by the ICC in Feb 2020. This analysis used four different total cost of development per square foot assumptions:

- Residential- Basic
- Residential- Specialty
- Commercial- Basic
- Commercial- Specialty

Using the Feb. 2020 ICC Valuation Tables cost of construction per square foot for basic one and two-family residential—VB (@ $122.46 sq./ft), the percentage increase in the cost of construction related to the new outlets example provided above, is 0.0033%.

Frequency/Prevalence Factor

Each provisional change was assigned a ranking that estimated how likely it is that the change would impact a construction project. Identifying prevalence or commonality is critical to understanding the magnitude of effect each provision could have in the state. This factor ensures that the impact of code changes that only apply to rare project types or circumstances are not attributed to all construction, and therefore over-estimate the impact. Conversely, it also ensures the estimates reflect a larger impact for the code changes that affect everyday construction projects.

Since more accurate data from permitting data or other RI data sources could not be provided to estimate the commonality of a code change, the following scale was used to rank the prevalence of a code change applying to a category of construction:

- High
- Medium
- Low
- Rare

These ranks corresponded to percentages that were used to generate the overall cost estimate. A frequency could be applied to up to four of the categories of construction noted in the list above, depending on the relevance of the code change to that type of construction.

Impact on Overall Construction Output

The percentage increases in construction costs and frequency factors were applied to an estimate of overall Rhode Island construction output. This figure represents the assumed statewide cost estimate. Since more accurate data from permitting data or other RI data sources was not available, the construction output estimates were based on national-level data, which were then proportionally applied to the state level in RI.

Total RI Construction Industry Output estimates and forecasts were based on national level BEA/Census/BLS data on gross output by industry and other economic indicators, and were then distributed to the state level. The overall state-level estimate was then distributed to the four types of construction outlined above using Census Bureau estimates of the Value of Construction Put in Place by type of construction.[9]

Calculation

$$\frac{Cost\ of\ Provision\ per\ Square\ Foot}{Cost\ of\ Construction\ per\ Square\ Foot} \times Frequency\ Factor \times RI\ Construction\ Industry\ Output = Estimated\ Statewide\ Impact\ of\ Provision$$

[9] https://www.census.gov/construction/c30/c30index.html

Calculation Example

Example: Cost of a Residential Provision (2 new fire protection outlets)			
Category	**Item**	**Estimate**	**Source**
Percentage Increase in Construction Costs	Cost of Provision in Prototype Project	$8	Estimate
	Square footage of Prototype Project	2,000	Estimate
	Cost of Provision Per Square Foot	**$0.004**	*Calculation*
	Total Cost of Development Per Square Foot: Basic Residential	$122.46	Based on Feb 2020 ICC Valuation Tables for VB-one and two family residential
	Percentage Increase of Cost of Development	**0.0033%**	*Calculation*
Prevalence	Frequency: Likelihood of provision applying to a residential project	25%	Analytic Assumption
RI Construction Output: Residential	Total RI Construction Industry Output	$4,530,337,315	Based on BEA/Census Data
	Percentage of Construction Output: Basic Residential	32.8 %	Based on category percentages from BEA Value of Construction Put-in-Place data
	RI Construction Industry Output: Basic Residential	$1,486,065,775	*Calculation*
Statewide Impact		**$12,135**	

Benefit Categorization and Comparisons

The proposed fire safety code changes that were identified and described in this analysis have benefits that are related to the change. In some cases, the proposed changes were associated with multiple categories of benefit.

Changes by Subject Area/Benefit Category

The proposed changes were categorized by the type of benefits that are related to that provision's change:

Categorization of Code Changes	
Category	**Description**
Safety	Positive impact on personal safety from immediate risks, likely lowering the chances of danger or injury.
Health/Livability	Positive impact on long-term health and enjoyment of living space.
Building Resiliency	Positive impact on the long-term durability and value of a structure.

Categorization of Code Changes	
Category	**Description**
Energy/Environ. Savings	Positive Impact on energy usage, conservation, or environmental effect.
New Materials/Technology	Positive Impact by incorporating the use of new types of building materials or technology.
Cost Savings	Positive impact through the lowering of construction or materials costs.
Flexibility	Positive Impact by increasing flexibility in building materials, methods, or designs.
Increase Permissiveness	Positive Impact through new allowances that lower requirements and other barriers.
Procedural/Administrative	Alters the method by which code provisions are administered or enforced.
Technical	Alters the provision to update technical language.

Appendix 1 provides additional information regarding the reasoning and benefits associated with each of the proposed code changes. The following table outlines the number of reviewed proposed changes that are associated with the following benefits:

Number of Changes to RI Fire Safety Codes by Benefit Type		
Code	**Fire Code**	**Life Safety Code**
Safety	1	18
Health/Livability	0	0
Building Resiliency	0	0
Energy/Environ. Savings	0	0
New Materials/Technology	0	0
Cost Savings	0	0
Flexibility	0	7
Increase Permissiveness	0	1
Procedural/Administrative	1	0
Technical	0	1

Results

Construction Cost Results/Estimate

The methodology outlined above estimates statewide annual construction cost impacts across the identified/quantified fire safety code revisions to be approximately $550 thousand per year, or a 3-year net present value cost of approximately $2 million between 2020-2023.

Comparison to Benefits

There are numerous benefits to the code changes that are being proposed that are not easily quantifiable. The Fire Safety Code Board of Appeal and Review focuses on public safety and welfare, and many of the proposed code revisions are likely to decrease risks associated with building construction and increase the safety and well-being of Rhode Islanders.

These benefits are not easily quantifiable, because they represent incremental changes to the risk and long-term building values. The qualitative analysis in this report notes the type of benefit and the justification for the proposed changes. For a means of comparison, the estimated construction costs noted above would be outweighed by benefits if just 0.0551 statistical lives were saved per year as a result of these changes. In reality, a combination of benefits—related to all of the categories noted above—will accrue to Rhode Islanders due to the proposed changes.

Conclusion & Determination

Pursuant to R.I. Gen. Laws § 23-28.3, the Fire Safety Code Board of Appeal and Review "has the power to promulgate, amend, and repeal rules and regulations to safeguard life and property from the hazards of fire and explosives." The statute further notes that "regulations, amendments, or repeals shall be in accordance with standard safe practice as embodied in widely recognized standards of good practice for fire prevention and fire protection." After considering each of the proposed changes and the alternative means of achieving the goals of each provision, the Fire Safety Code Board of Appeal and Review has determined:

- that the benefits of the proposed changes to the state fire safety codes justify the costs of the proposed rule, and
- that the proposed rule will achieve the objectives of the authorizing statute in a more cost-effective manner, or with greater net benefits, than other regulatory alternatives.

Appendix 1: List of Significant Changes and Information

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Be
NFPA 1	18.2.3.4	Traffic Signal Pre-emption	Addition	Requires that all new traffic signals on fire department access roads in jurisdictions that employ a traffic signal pre-emption system be interfaced.	Unknown	Sa
NFPA 1	Chapter 38	Marijuana Growing, Processing or Extraction Facilities	Addition	A compilation of numerous existing requirements found in other chapters of the Code brought into one location.		Pr
NFPA 101	7.2.1.8.4	Delayed Action Closers on Doors	Permitted	Optional		Fl
NFPA 101	7.11.6	High Hazard Areas	Doors required to swing in the direction of egress travel	Existing requirements from other sections	No change in cost	Pr
NFPA 101	8.2.2.5	Wall Marking and Identification	Requires identification of concealed fire & smoke barriers in new construction	Provides guidance to persons working above a ceiling or other concealed area within a floor or ceiling to identify fire barriers, smoke barriers, or smoke partitions from those walls that are not constructed as such	Increase	Te
NFPA 101	12.2.1.2 New Assembly	Means of egress	Requires grab bars on bathtubs and showers	Requires any new bathing facilities in assembly occupancies to be provided with grab bars meeting the requirements of 24.2.8 to reduce the likelihood of accidental slips and falls.	Increase	Sa

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Be
NFPA 101	12.3.4.4 New Assembly	CO Detection	Requires CO detection in areas with fuel-burning appliances or fireplaces.	New requirement for carbon monoxide detection and alarms but only for new assembly occupancies and only if a source of carbon monoxide generation is present.	Increase	Sa
NFPA 101	14.2.1.5 New Educational	Means of egress	Requires grab bars on bathtubs and showers	Mandates the presence of grab bars where bathtubs, bathtub-shower combinations, and showers are present in facilities such as student and staff locker room bathtubs and showers, if present.	Increase	Sa
NFPA 101	14/15.2.2.2.4 New Educational	Means of egress	Permits alternate classroom locking mechanisms to prevent intruders, eliminating the need/use of non-compliant devices	Special set of provisions for locking classroom doors to prevent unwanted entry.	Optional	Sa
NFPA 101	14/15.2.3.2.2 New Educational	Means of egress	Addition	Allows corridor width to be reduced from 76" to 44" where the required capacity is < 100 persons	Decrease	Co Pe
NFPA 101	14.3.4.4.2 New Educational	CO Detection	Addition	Requires transmission of alarm signals to approved on-site or off-premises locations	Increase	Sa
NFPA 101	16.2.1.1 New Day Care	Means of egress	Addition	Requires grab bars on bathtubs and showers in new constructions only.	Increase	Sa

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Be
NFPA 101	16/17.2.2.2.6 New Day Care	Means of egress	Permits alternate classroom locking mechanisms to prevent intruders, eliminating the need/use of non-compliant devices	Special set of provisions for locking classroom doors to prevent unwanted entry.	Optional	Sa
NFPA 101	26.2.4 Lodging / Rooming	Means of egress	Addition	Requires grab bars on bathtubs and showers.	Increase	Sa
NFPA 101	28.2.1.4 New Hotels and Dormitories	Means of egress	Addition	Requires grab bars on bathtubs and showers.	Increase	Sa
NFPA 101	30.2.1.3 New Apartments	Means of egress	Addition	Requires grab bars on bathtubs and showers. Applies not only in apartment units, but also to showers, for example, in a fitness center changing room	Increase	Sa
NFPA 101	30.3.4.6.5 New Apartments	CO Detection	Requires transmission of alarm signals to approved on-site or off-premises locations	Requires CO detectors in rooms that contain fuel-fired heating equipment and that are not normally occupied to transmit their alarms to a location in the building approved by the authority having jurisdiction or to an off-site location	Increase	Sa
NFPA 101	32.2.2.7 New Residential Board & Care	Means of egress	Addition	Requires grab bars on bathtubs and showers in small residential facilities, not only to bathtubs and showers for residents' use, but also to staff facilities.	Increase	Sa

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Be
NFPA 101	32.3.2.1.3 New Residential Board & Care	Means of egress	Addition	Requires grab bars on bathtubs and showers in large residential facilities, not only to bathtubs and showers for residents' use, but also to staff facilities.	Increase	Sa
NFPA 101	36.2.1.6.1 New Mercantile	Means of egress	Addition	Requires grab bars on bathtubs and showers in new business occupancies.	Increase	Sa
NFPA 101	38.2.1.5.1 New Business	Means of egress	Addition	Requires grab bars on bathtubs and showers in new businesses.	Increase	Sa
NFPA 101	38/39.2.2.2.2 New Business	Means of egress	Permits alternate locking mechanisms to prevent intruders, eliminating the need/use of non-compliant devices	Special set of provisions for locking doors to prevent unwanted entry.	Optional	Sa
NFPA 101	40.2.1.3 Industrial	Means of egress	Addition	Requires grab bars on bathtubs and showers, limited to newly installed bathtubs, bathtub-shower combinations, and nonemergency showers in new industrial occupancies	Increase	Sa
NFPA 101	42.2.1.3 Storage	Means of egress	Addition	Requires grab bars on bathtubs and showers, limited to newly installed bathtubs, bathtub-shower combinations, and nonemergency showers in new storage occupancies	Increase	Sa

Resources

1. NOAA National Centers for Environmental Information (NCEI), U.S. Billion-Dollar Weather and Climate Disasters (2020), <https://www.ncdc.noaa.gov/billions/events/US/2020>, accessed on December 4, 2020.
2. Building Codes Save: A Nationwide Study of Loss Prevention, Federal Emergency Management Agency (FEMA), November 2020, <https://www.fema.gov/emergency-managers/risk-management/building-science/building-codes-save-study>, accessed on December 9, 2020.