ANALYSIS OF RI STATE FIRE SAFETY CODES

Fire Safety Code Board of Appeal and Review

Fire Safety Code Board of Review

November, 2018

Contents

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 code. The current fire safety codes are filed with the Rhode Island Secretary of State's office. Each of the RI State Fire Safety Codes include:

- An underlying base code (and any applicable supplements), incorporated by reference, from the National Fire Protection Association (NFPA), and
- Rhode Island-specific amendments to these base codes that are developed by RIFSCBAR.

RIFSCBAR is proposing changes to the Rhode Island State Fire Safety Code Regulations. These changes include updating the base codes to a more recent version of the relevant national/international base codes—updating from the NFPA 2012 family of model codes to the NFPA 2015 model codes. RIFSCBAR has also compiled RI-specific amendments that make changes to these base codes to better align with the specific needs of Rhode Island.

Building and fire codes have a significant impact on the state. The following economic analysis will explain the process of regulatory development and the potential impacts that these regulations will have on Rhode Islanders. The construction standards in the state building and fire codes impacts include:

- Safety, health, livability, and environmental impacts related to increased protective requirements;
- Building quality and resiliency impacts related to higher-quality construction and energy savings requirements;
- Construction cost impacts related to the cost of construction and compliance with the state building and fire 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 $1.6 million, for a 5-year net present value of $7.2 million. These costs are related to significant health, safety, building resiliency, and other benefits.

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) 2012 editions to the 2015 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	2012 NFPA-1	2015 NFPA-1
450-RICR-00-00-8	RI Life Safety Code	2012 NFPA-101	2015 NFPA-101

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 meetings, which eventually leads to 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

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

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.

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 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, 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.

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

Significant Revisions to the Fire Safety Codes

Explanation of Significant Changes and Themes

Harmonization with RI Building Code

An important initiative during this round of code adoption is the harmonization of conflicting areas between the building and fire codes. Extensive outreach to stakeholders has been conducted to pinpoint conflicts, and identify requirements that might create confusion.

Currently, the unwritten rule-of-thumb is: where the fire and building codes differ, the more restrictive of the two requirements is to be followed. However, it is not always clear which is more restrictive. Take for example an area of confusion often brought up by stakeholders; that of "handrails". The 2012 building code requires a "minimum" of 1 ½" clearance and the 2012 life safety code requires "not less than" 2 ¼" clearance. This discrepancy was reconciled by modifying the fire safety code to require handrails to have a minimum of 1 ½" clearance.

Likewise, several requirements in the 2012 Building Code have been removed from the 2015 code to eliminate the confusion of which code is to be followed. Specifically:

Code	Citation	Description
SBC-1	1011.5.2	Deleting Exception 3 of building code this would make building and fire codes consistent for Group R-3 & R-2 trade and riser heights.
SBC-1	1003.5	Deleting Exception 1 of building code this would make building and fire code consistent and would require all exit doors level at interior to exterior.

The harmonization initiative has identified discrepancies between the codes, which has led to changes to both codes. More importantly though, it has brought attention to the need for a more streamlined and uniform enforcement process. To help achieve this, beginning in Jan 2019, DBR's Division of Building, Design and Fire Professionals will conduct joint training sessions of all municipal building and fire inspectors. More training sessions, and an increased cooperation between the building and fire communities, will bring about greater consistency in inspections.

Alarm, Detector, and Notification Systems

Many significant revisions impacted the requirements associated with monitoring, detection, alert, and alarm systems.

The RIFSCBAR has reviewed the status of the many Blanket Variances and Formal Interpretations issued since 2003 and the initial full implementation of the NFPA-based codes as it relates to fire alarms systems, smoke detection and carbon monoxide detection and has incorporated the most frequent sections where variance relief has been granted into the code itself. Many of these changes, although not all, afford the property owner RI-specific relief from the base code requirements as seen through past practices, enforcement and variances. These sections were not reviewed in a vacuum however, as other factors such as automatic sprinkler requirements, egress system requirements and construction methods and limitation were evaluated, and a balance struck, with emphasis placed on safety to life over protection of property.

The following list notes many of the significant alert system revisions:

Code	Citation	Brief Description	Explanation
Fire Code	13.3.1.8.1.2.1	Central Station Monitoring	Provision allows supervisory signal to sound on the fire alarm control panel instead of at a constantly attended location or being sent to a central station.
Life Safety Code	9.6.2.11(5)	detectors at above ceiling spaces	Requirements for above ceiling heat detection revised
Life Safety Code	11.8.5.2.4(8)	stairway video monitoring (no generator cost)	New requirement requiring standby power for stairway video monitoring equipment in high-rises.
Life Safety Code	11.8.6.2(12)	stairway video monitoring	New requirement requiring stairway video monitoring equipment in emergency command centers in high-rises
Life Safety Code	12.3.4.3.3	audible notification for fire alarm	Requires voice evacuation fire alarm systems in new places of assembly with an occupant load exceeding 150 persons.
Life Safety Code	14.3.4.3.1.3	fire alarm with dual purpose paging	Provision permitting fire alarm system to be utilized for other purposes deleted.
Life Safety Code	14.3.4.4.1	carbon monoxide coverage	New requirement to provide carbon monoxide alarms or detectors in specific locations
Life Safety Code	16.3.4.6.1	elimination of carbon monoxide units	New provision clarifying which buildings carbon monoxide alarms are required in.
Life Safety Code	17.3.4.5.1	elimination of smoke alarms	New exception to omit the installation of smoke alarms, where they were not required in previous code editions.
Life Safety Code	17.3.4.6.1	elimination of carbon monoxide units	New provision clarifying which buildings carbon monoxide alarms are required in.
Life Safety Code	17.6.3.4.4	permitted use of battery operated smoke alarms	Reserved provision permitting the use of battery-operated smoke alarms.

Code	Citation	Brief Description	Explanation
Life Safety Code	17.6.3.4.5	elimination of carbon monoxide units	New provision clarifying which buildings carbon monoxide alarms are required in.
Life Safety Code	24.6.2.1.1.1	garage smoke/heat detection	New requirement for the installation of a smoke alarm or heat alarm to be provided in attached garages of new homes.
Life Safety Code	25.2.1.1	common area smoke alarms	New requirement for smoke alarms in common areas which was not in the previous edition of the code. The edition prior to the last did have a similar requirement.
Life Safety Code	25.2.1.2	interconnection of smoke alarms	New requirement for smoke alarms in common areas which was not in the previous edition of the code. The edition prior to the last did have a similar requirement.
Life Safety Code	25.2.1.3.1	carbon monoxide units at specific locations	New provision clarifying where carbon monoxide alarms are required.
Life Safety Code	25.2.1.5	carbon monoxide units at specific locations	New provision permitting the use of hardwired devices with wireless interconnection technology.
Life Safety Code	32.3.3.8.3	Kitchen Requirements	New provisions for cooking facilities which mirror those in healthcare occupancies.

Egress

Many significant revisions impacted the requirements associated with egress:

Code	Citation	Brief Description	Explanation
Life Safety Code	7.1.3.2.1(9)(b)	Doors open to exit enclosures	New exception permitting doors from not normally occupied building service equipment areas in accordance with 7.13 to open into exit enclosures
Life Safety Code	7.2.1.3.7	Step down at door	Permits a step down at doors to not normally occupied spaces.

Code	Citation	Brief Description	Explanation
Life Safety Code	7.2.1.4.3.2	existing door arrangement - re-swing	Revised provision for door leaf encroachment which provides an exception to the 7-inch rule when fully open for self-closing doors
Life Safety Code	7.2.1.6.1.1(4)(b)	delayed egress hardware	New provision for delayed egress locking systems for doors that swing against the direction of egress travel.
Life Safety Code	7.2.1.11.1.3	Turnstile installation	New provisions permitting the installation of security turnstiles in the means of egress.
Life Safety Code	7.2.2.4.4	additional handrail on stairs	
Life Safety Code	7.2.5.2	vehicle ramp as means of egress	Permits a vehicle ramp to be used as a means of egress.
Life Safety Code	8.6.9.7(3)	eliminate rolling shutters at escalators	New provision limiting escalator or moving walk openings to a maximum of four contiguous stories, unless otherwise permitted by the occupancy chapters.
Life Safety Code	15.3.6(6)	self-closing doors	New provision exempts corridor doors from requirement to be self-closing where a fire alarm system is provided.
Life Safety Code	20.2.4.3	egress door requirements	Provision requiring a patient care suite of rooms greater than 2,500 square feet to have two exit access doors deleted.
Life Safety Code	21.2.4.3	egress door requirements	Provision requiring a patient care suite of rooms greater than 2,500 square feet to have two exit access doors deleted.

Sprinkler Systems

Some significant revisions impacted the requirements associated with sprinkler systems:

Code	Citation	Brief Description	Explanation
Fire Safety Code	13.3.2.30	Sprinkler System Requirements	New provision requiring automatic sprinkler systems to be installed in new industrial occupancies meeting certain dimensions.

Code	Citation	Brief Description	Explanation
Fire Safety Code	13.5.3	Backflow device on domestic water	Included references to NFPA 13D and NFPA 13R for backflow prevention devices.
Life Safety Code	8.6.7(6)(a)	additional sprinkler zone re: smoke control systems	Revised requirement to require smoke control system to be activated upon actuation of the sprinkler system in the atrium and spaces open to the atrium instead of any sprinkler activation.
Life Safety Code	11.3.1.3.2	non-sprinklered towers	Added provision for electronic supervision and monitoring of waterflow alarms for sprinkler systems in towers.
Life Safety Code	30.3.5.4	Sprinkler requirement in bathrooms	New exception to providing sprinklers in certain bathrooms.
Life Safety Code	31.3.5.4	Sprinkler requirement in bathrooms	New exception to providing sprinklers in certain bathrooms.

Table of Significant Revisions to Fire Codes

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

RI-Specific Changes to Fire Codes

The following tables provides an overview of the significant revisions to the Rhode Island-specific amendments to the Rhode Island State Fire and Life Safety Codes:

Section 7: RI Amendments to State Fire Code

Section 7 Citations	Topic	Area of Impact	Brief Explanation of Amendment
1.7.7.6	Inspection	Procedural/Administrative area of inspections	Clarifies that the State Fire Marshal's Office is the governing authority.
1.10.1.1.5.2	Fire Code Board of Appeals; Membership	Technical/ Clarification of Administrative Procedures	Adds local clarification for members and alternates of the Board specific to RI.

Section 7 Citations	Topic	Area of Impact	Brief Explanation of Amendment
1.10.1.1.5.3	Fire Code Board of Appeals; Membership	Technical/ Clarification of Administrative Procedures	Adds local clarification of Board member and alternate requirements specific to RI.
1.16.4.1	Penalties	RI Specification of Administrative Procedures	Adds local clarification specific to RI.
10.13.1.1.1	Combustible Vegetation	Safety of Building Residents	Blanket Variance regarding indoor Christmas trees.
13.3.1.8.1.2.1	Supervision; Alarm Signal Transmission	Properties requiring off-premise transmission of certain alarm signals	Provides property owners an alternative for compliance with the requirements to transmit certain fire alarm signals off premises.
13.3.2.8.1	Sprinkler Coverage	Existing places of assembly	Statutory – increase the threshold for sprinklers from 100 to 150.
25.2.6.1.1	Tent requirements	Removes tents at private residences from the requirements	Statutory change.
25.2.6.2	SAA	Codifies a scenario subject to frequent variance requests	Reduces the requirement for monthly inspections to annually if approved by the AHJ.
50.5.4.1	Commercial Cooking	Codifies a scenario subject to frequent variance requests	Provides relief to owners of seasonal businesses, reducing the requirements for maintenance of commercial cooking systems from semi-annual to annual.

Section 8: RI Amendments to State Life Safety Code

Section 7 Citations	Topic	Area of Impact	Brief Explanation of Amendment
6.1.14.3.2.1	Multiple Occupancies	Properties where there is a comingling of commercial and residential uses	Provides relief to owners of property with multiple occupancies where a residential occupancy is located above a non-residential occupancy. Similar relief is provided for in the national standard in chapters 24, 30 and

Section 7 Citations	Topic	Area of Impact	Brief Explanation of Amendment
			31 however use of these provisions is precluded by statute
9.2.3.1	Commercial Cooking	Codifies a scenario subject to frequent variance requests	Provides relief to owners of seasonal businesses, reducing the requirements for maintenance of commercial cooking systems from semi-annual to annual.
9.6.1.5	Fire alarm system impairments	Properties where a required fire alarm system is taken out of service	Eases and standardizes the steps necessary for a property owner to take when a fire alarm system is impaired.
9.6.2.11(5)	Fire alarm	Clarifies and simplifies the requirements for above-ceiling detection	Reduces the detection requirements for certain buildings.
9.6.4.4.1	Fire alarm	Properties requiring off-premise transmission of certain alarm signals	Provides property owners an alternative for compliance with the requirements to transmit certain fire alarm signals off premises.
9.6.5.5	Fire alarm	Properties that are required to conduct fire drills – reduces unnecessary false alarms caused by operator error	Restores the requirement for a fire alarm drill switch in certain occupancies that was inadvertently omitted from the previous code edition. This provision allows property owners/tenants to conduct fire drills without the need to call the fire department and/or an electrician.
9.6.7.4.6	Fire alarm	Allowance for properties with existing sprinkler systems	Reduces the requirements for annunciation of sprinkler systems in certain situations.
9.6.8.8.3	Fire alarm	Properties with wireless fire alarm systems	This section provides additional options to the property owner for a failed wireless fire alarm system other than complete system replacement.
9.6.9.4.1	Fire alarm	None	No change – relocation of requirement from a different section of the code.
9.6.9.10	Fire alarm	Properties with existing fire alarm systems	Added relief to property owners with previously approved fire alarm installations.

Section 7 Citations	Topic	Area of Impact	Brief Explanation of Amendment
9.6.10.5	Fire alarm	Properties with new fire alarm systems	Adds the requirement for an inspection certification for **new** fire alarm installations – one-time $3.00 cost per system.
9.6.11.6	Fire alarm	Affects fire alarm system installers – licensing requirement not covered clearly by electrician licensing rules	Restores and clarifies the licensure requirements for persons/firm providing inspection, testing and maintenance of fire alarm systems. This is in coordination with the DLT licensing requirements for electricians.
9.7.1.6	Sprinklers	Properties with elevators and sprinklers – eliminates conflict between codes	Provides relief to property owners from the requirements for sprinkler protection in certain elevator installations.
9.7.1.7	Sprinklers	Properties with sprinkler system – improvement to certification of testing	Adds the requirement for an inspection certification for automatic sprinkler installations – annual $3.00 - 12.00 cost per system.
9.7.2.1.2.1	Sprinklers	Properties requiring off-premise transmission of certain alarm signals	Provides property owners an alternative for compliance with the requirements to transmit certain fire alarm signals off premises.
12.3.4.3.3	Fire alarm	New places of assembly – incorporates the national trend of voice notification for large numbers of occupants	Modifies the requirements for voice-notification fire alarm system for **new** places of assembly with an occupant load over 150 persons.
15.3.6	Egress	Existing schools – recognizes the older age of the state's schools and lack of compliance	Provides relief from door-closer requirements of classroom doors for existing schools.
16.6.3.4.5	Fire alarm	Correction	Corrects the referenced section.
17.3.4.5.1	Fire alarm	Recognition of existing installations	Provides relief from the smoke detector requirements for existing day care occupancies with existing smoke alarms.

Section 7 Citations	Topic	Area of Impact	Brief Explanation of Amendment
24.6.2.1.1.1	Smoke and CO detection	Previous code requirement for private dwellings that was omitted in error	Restores the requirement for a heat detector in attached garages of **new** 1- and 2- family dwellings.
24.6.3.1.1	Smoke and CO detection	Codification of many past code cycle requirements as currently set forth in a Formal Interpretation	Codifies existing smoke and CO alarm requirements for existing 1- and 2-family dwellings and provides relief from the national standards, allowing for lesser requirements according to the year of construction.
25.2.1.1	Smoke and CO detection	Previous code requirement for private dwellings that was omitted in error	Clarifies and standardizes the requirements for smoke and CO alarms in 3-family apartment buildings. Restores the requirement for smoke alarms in common spaces of non-sprinklered buildings.
29.3.4.2	Fire alarm	Codification of multiple variances issued to existing motels	Reduces the requirements for manual fire alarm boxes in existing hotels & motels.

Regulatory Impact Analysis

The Rhode Island state building and fire codes are some of the largest and most significant regulations in the state, and have a far-reaching impact that affects the quality, safety, and cost of construction in Rhode Island. These impacts include:

- Safety, Health, livability, and environmental impacts related to increased protective requirements;
- Building quality and resiliency impacts related to higher-quality construction and energy savings requirements;
- Construction cost impacts related to the cost of construction and compliance with the state building code requirements;
- 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. Some of the proposed changes also alter the way in which the fire codes are administered by state and local entities that have jurisdiction.

Builders and Construction Industry

Many 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 safety, building resiliency, and efficiency savings—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.[3] Massachusetts adopted the current edition of the fire safety codes on January 1st, 2018.[4] The NFPA and ICC maintain lists of Code Adoptions by state.[5]

Methodology

The Fire Safety Code Board of Appeal and Review and Building Code Commission, 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.

Identification and Explanation of Code Changes

Each change in the building and fires codes that was identified as a significant revision was included in a 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

[3] https://portal.ct.gov/DAS/Office-of-State-Fire-Marshal/CT-Fire-Safety-and-Prevention-Codes
[4] https://www.mass.gov/service-details/massachusetts-fire-code
[5] 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

    - 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 on page 14.

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 BCC based their estimates on material provided by external consultants and other subject matter experts 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 GFCI outlets to be installed in two common home locations that typically do not have GFCI 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 GFCI outlets. Since the wiring, outlets, and labor would be installed regardless of the code change, the incremental cost difference would be the difference between two GFCI outlets vs. two regular outlets. Using an example cost difference of $10, the cost of two additional GFCI outlets is $20 per 2,000 square foot home, or $0.01 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. This analysis used four different total cost of development per square foot assumptions:

- Residential- Basic

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

Using the value for Residential-Basic, the percentage increase in the cost of development related to the GFCI example provided above is 0.01%.

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.[6]

Calculation

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

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

Calculation Example

Example: Cost of a Residential Provision			
Category	**Item**	**Estimate**	**Source**
Percentage Increase in Construction Costs	Cost of Provision in Prototype Project	$100	Estimate
	Square-footage of Prototype Project	2,000	Estimate
	Cost of Provision Per Square Foot	**$0.05**	*Calculation*
	Total Cost of Development Per Square Foot: Basic Residential	$130	Based on ICC Valuation Tables for R-3 Residential
	Percentage Increase of Cost of Development	**0.04%**	*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		**$142,891**	

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.
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 A 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 Codes by Benefit Type		
Code	**Fire Safety Code**	**Life Safety Code**
Safety	5	55
Health/Livability	0	1
Building Resiliency	1	2
Energy/Environ. Savings	0	0
New Materials/Technology	0	1
Cost Savings	3	9
Flexibility	2	26
Increase Permissiveness	2	8
Procedural/Administrative	2	23
Technical	1	7

Benefits Related to Significant Provisions

Proposed revisions to the fire code that have an estimated cost impact also have the following benefits related to the change:

Benefits Related to Select Provisions		
Code	**Provision**	**Explanation of Benefit**
RIFC 11.12.3.2	Ground-mounted Photovoltaic Solar Installations	Allows for the property owner to submit a vegetative management plan for the site in lieu of providing a non-combustible base which can be very costly and difficult to accomplish.
RIFC 13.3.1.8.1.2.1	Alarm Supervisory Signals	Allows for sprinkler alarm supervisory signals to sound in a common or public area of a building in lieu of requiring a constantly attended location or transmission to an off-site facility as a cost-saving accommodation for the property owner.
RIFC 50.5.4.1	Commercial Cooking – Maintenance of Equipment	Allows for seasonal operation facilities to perform the required maintenance annually in lieu of the required semi-annual schedules as a cost-saving accommodation for the property owner.
RILSC 9.6.2.2.1.1	Fire Alarm System Manual Fire Alarm Boxes	Allows for the numerous single-action manual fire alarm boxes throughout the state to be continued in service without replacing them with the required double-action devices. A substantial cost savings will be realized by adding a relatively inexpensive protective cover to the existing device in lieu of replacing the entire unit.
RILSC 9.6.10.5	Automatic Sprinkler System Testing	Provides for a convenient and inexpensive mechanism for the fire inspector to determine the operational status of a building's sprinkler system by utilizing a Uniform Test Report (UTR) sticker at the fire alarm control unit.

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 $1.56 million per year, or a 5-year net present value cost of approximately $7.2 million between 2019-2023.

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 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 0.2 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	Benefits
NFPA 1	Table 1.12.8(a)		Deletion of allowance for AHJ to require a permit for consumer fireworks. This deletion is based on NFPA's deletion of all regulations related to consumer fireworks.		Decrease in Cost	Procedural/Administrative
NFPA 1	3.3.130.1	Gross Floor Calculation	Excludes floor openings associated with atriums and communicating spaces from gross floor area calculation.	The primary change was to 3.3.130.2 for net floor area. These terms were revised to clarify that net area does not always have to be calculated for an entire floor or fire compartment.	Decrease in Cost	Technical
NFPA 1	10.10.9.3		New provision prohibiting the use of sky lanterns		Unknown	Safety
NFPA 1	13.3.1.8.1.2.1	Central Station Monitoring	Provision allows supervisory signal to sound on the fire alarm control panel instead of at a constantly attended location or being sent to a central station.	Gives relief from the requirement for off-premises monitoring and provides an additional exception/option to the owner that permits a signal that sounds in a common area of a building to be deemed equivalent to an area that is constantly attended.	Decrease in Cost	Safety, Cost Savings, Flexibility

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA 1	13.3.2.30	Sprinkler System Requirements	New provision requiring automatic sprinkler systems to be installed in new industrial occupancies meeting certain dimensions.	This is a new provision extracted from NFPA 5000.	Increase in Cost	Safety, Building Resiliency
NFPA 1	13.5.3	Backflow device on domestic water	Included references to NFPA 13D and NFPA 13R for backflow prevention devices.	This takes into consideration the other types of sprinkler systems utilized in addition to NFPA 13 - all have the same potential risk to contaminate water supplies.	Increase in Cost	Safety
NFPA 1	18.4.5.2	Provision for sprinkler 5,000 sf residential, 1 & 2 family	New provisions for one and two family dwellings exceeding 5,000 square feet in area.	Any input regarding background/reasoning would be 100% speculation. One and two family homes excluded from RI Fire Safety Code		Procedural/Administrative
NFPA 1	18.5.1.1	Requirements for Fire Hydrants	The requirements for fire hydrants were revised from a performance-based requirement in the Annex to prescriptive requirements for fire hydrant location and distribution.	This minimizes the risk to damage to the underground piping and/or contamination of the water supply where the system flow is not adequate	Decrease in Cost	Increase Permissiveness, Cost Savings

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA 1	18.5.1.2	Requirements for Fire Hydrants	The requirements for fire hydrants were revised from a performance-based requirement in the Annex to prescriptive requirements for fire hydrant location and distribution.	As explained in the code, this determination is made on a case-by-case basis subject to several factors	Decrease in Cost	Cost Savings, Flexibility, Increase Permissiveness
NFPA 1	18.5.8	Hydrant protection	The requirements for fire hydrants were revised from a performance-based requirement in the Annex to prescriptive requirements for fire hydrant location and distribution.	Necessary to ensure reliable water supply for firefighting	Increase in Cost	Safety
NFPA-101	3.3.49		Deletion of definition of consumer fireworks, based on NFPA's retraction of all codes regulating consumer fireworks.		Decrease in Cost	Procedural/Administrative
NFPA-101	6.1.14.4.6		New provision allowing atrium walls to be utilized as part of a building separation. This provision is referenced from most occupancy chapters.		Decrease in Cost	Procedural/Administrative

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	7.1.3.2.1(9)(a)	vestibules	New allowance for vestibules from not normally occupied spaces to open into exit enclosures. This codifies a previously utilized strategy for correcting not normally occupied spaces opening into exit enclosures.	This recognizes the often practiced, but heretofore non-compliant, arrangement whereby a vestibule is created to prevent a normally unoccupied space from opening onto an exit enclosure.	Increase in Cost	Safety
NFPA-101	7.1.3.2.1(9)(b)	Doors open to exit enclosures	New exception permitting doors from not normally occupied building service equipment areas in accordance with 7.13 to open into exit enclosures	This treats a normally unoccupied building equipment support area as a normally occupied space, but it requires that the separation between such space and the exit enclosure be based on the provisions applicable to an exit enclosure that connects 4 or more stories - site dependent separation determination	Decrease in Cost	Safety, Procedural/Administrative
NFPA-101	7.1.8		Would exempt the installation of guards where permitted by the occupancy chapters			Procedural/Administrative

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	7.2.1.3.7	Step down at door	Permits a step down at doors to not normally occupied spaces.	This recognizes that less stringent requirements which are designed to maintain accessibility for persons in wheelchairs, walkers, etc. are not as important for spaces that are not normally occupied	Decrease in Cost	Safety, Cost Savings, Flexibility
NFPA-101	7.2.1.4.3.2	existing door arrangement - reswing	Revised provision for door leaf encroachment which provides an exception to the 7-inch rule when fully open for self-closing doors	This recognizes that the more stringent restrictions on corridor encroachment may be lessened if he door is equipped with a self-closing device	Decrease in Cost	Safety, Cost Savings, Flexibility
NFPA-101	7.2.1.6.1.1(4)(b)	delayed egress hardware	New provision for delayed egress locking systems for doors that swing against the direction of egress travel.	This recognizes that having a sign stating PUSH on a door that swings against exit travel is unnecessary	Decrease in Cost	Safety, Cost Savings, Flexibility
NFPA-101	7.2.1.11.1.3	Turnstile installation	New provisions permitting the installation of security turnstiles in the means of egress.	This is a new provision keeping up with technology that recognizes and addresses the installation of security turnstiles, and are permitted by the various occupancy chapters	Increase in Cost	Safety

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	7.2.1.15.2		Performance based option can permit inspection frequencies to be extended beyond the prescriptive 1 year inspection requirement.		Decrease in Cost	Flexibility
NFPA-101	7.2.1.15.6(12)	door hardware markings		Verification of door hardware markings	Increase in Cost	safety, Procedural/Administrative
NFPA-101	7.2.2.4.4	additional handrail on stairs		This recognizes that not all stairs are completely square (90 degrees) and require at least one handrail to be so	Increase in Cost	Safety, Health/Livability
NFPA-101	7.2.4.3.2		New exception permitting fire rating serving horizontal exit to not extend to stories below the lowest level providing discharge to the exterior, where separated from the level above by two hours.		Decrease in Cost	Safety
NFPA-101	7.2.4.3.4(2)	terminate fire barrier	New provision which permits horizontal exit fire barrier to terminate at an outside wall where one wall has a two-hour rating with 1 1/2-hour opening protectives.	This offers two different methods of compliance with an existing requirement	Decrease in Cost	Flexibility, Cost Savings
NFPA-101	7.2.5.2	vehicle ramp as means of egress	Permits a vehicle ramp to be used as a means of egress.	This exemption recognizes that not all ramps are part of an accessible means of egress	Decrease in Cost	Flexibility, Increase Permissiveness, cost savings
NFPA-101	7.2.8.1.1		Adds occupancy permission for use of fire escape stairs			Procedural/Administrative

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	7.2.8.4.2	fire escape stairs- slip resistant surfaces	Eliminates the requirement for slip resistant surfaces on new fire escape stairs.	This section was deleted and is now covered by 7.1.6.4	Decrease in Cost	Flexibility
NFPA-101	7.3.1.2		New occupant load factor.		Unknown	Procedural/Administrative
NFPA-101	7.3.1.2		Revised occupant load factor.		Unknown	Safety
NFPA-101	7.14.1.3		New provision requiring Occupant Evacuation Elevators to meet the occupant evacuation operation (OEO) requirements of ASMEA17.1 .		Increase in Cost	Safety
NFPA-101	7.14.8.2	rated wiring at elevator hoistways	Modified wiring requirements for occupant evacuation elevators from a minimum 1-hour fire resistance rating to a minimum 2-hour fire resistance rating. However, clarifies that it applies to wires installed outside of hoistways and machine spaces.	This addresses a relatively new concept where elevators may be used for occupant evacuation. This section requires that such elevator wiring be protected throughout the building so that a fire remote from the hoistway or lobby does not disable the elevator power supply	Increase in Cost	Safety
NFPA-101	8.5.5.4.1	HVAC fire, smoke, combination dampers	Reference to NFPA 90B and NFPA 80 have been added to the language for the installation of fire, smoke, and combination dampers.	This recognizes that there are two additional standards that are applicable to the testing of this specialized equipment	Increase in Cost	Technical, Safety

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	8.5.5.5.2	Access to dampers	Additional requirements provided for minimum requirements for access to dampers. Requirements include: large enough to allow inspection and maintenance, access doors in ducts shall be tight fitting, and access shall comply with the mechanical code.	Applies only to new construction and designed to ensure necessary access for inspection and maintenance	Increase in Cost	Safety, Building Resiliency
NFPA-101	8.6.7(6)(a)	additional sprinkler zone re: smoke control systems	Revised requirement to require smoke control system to be activated upon actuation of the sprinkler system in the atrium and spaces open to the atrium instead of any sprinkler activation.	This is an engineering determination that clarifies the relationship between a smoke management system and a sprinkler system that serve an atrium	Increase in Cost	Safety, Building Resiliency
NFPA-101	8.6.9.7(3)	eliminate rolling shutters at escalators	New provision limiting escalator or moving walk openings to a maximum of four contiguous stories, unless otherwise permitted by the occupancy chapters.	Allows more design flexibilty because of sprinkler protections and reduces cost	Decrease in Cost	Flexibility, Cost Savings, Increase Permissiveness
NFPA-101	9.2.3.1		Changes the requirement for maintenance of kitchen exhaust ductwork from twice a year to once a year.		Decrease in Cost	Procedural/Administrative
NFPA-101	9.6.2.11(5)	detectors at above ceiling spaces	Requirements for above ceiling heat detection revised	Incorporates an existing Blanket Variance	Decrease in Cost	cost savings, Safety, Increase Permissiveness

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	9.6.4.4.1		New provision permitting supervisory and trouble signals to sound in a public or common area when required by the code to be displayed at constantly attended location.		Decrease in Cost	Procedural/Administrative
NFPA-101	9.6.8.8.3		Option to repair or alter wireless systems having multiple false alarms added to code. Was previously required to be replaced with a wired system.		Decrease in Cost	Procedural/Administrative
NFPA-101	9.6.9.10		New language added permitting previously approved junction points to remain.			Procedural/Administrative,
NFPA-101	9.8.2.3		New provision permitting required heat detectors to be omitted in in areas protected by an automatic water mist system.			Procedural/Administrative
NFPA-101	11.3.1.3.2	non-sprinklered towers	Added provision for electronic supervision and monitoring of waterflow alarms for sprinkler systems in towers.	Clarifies that the supervisory requirements for sprinkler systems in towers are the same as other occupancies		Safety
NFPA-101	11.7.4.1		Definition excepting some underground structures removed.		Increase in Cost	Safety

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	11.8.5.2.4(8)	stairway video monitoring (no generator cost)	New requirement requiring standby power for stairway video monitoring equipment in high-rises.	Requires that if there is stairway video monitoring equipment, it shall be connected to the already required standby power system	Increase in Cost	Safety
NFPA-101	11.8.6.2(12)	stairway video monitoring	New requirement requiring stairway video monitoring equipment in emergency command centers in high-rises	Requires that if there is stairway video monitoring equipment, it shall be connected to the already required emergency command center	Increase in Cost	Safety
NFPA-101	12.2.5.6.8		New provisions for Aisle Landings		Increase in Cost	Safety
NFPA-101	12.2.5.6.9.5	Aisle Transitions	New handrail provisions for aisle transition stairs		Increase in Cost	Safety
NFPA-101	12.2.5.6.9.6	Aisle transitions	New handrail provisions for aisle transition stairs		Increase in Cost	Safety
NFPA-101	12.3.4.3.3	audible notification for fire alarm	Requires voice evacuation fire alarm systems in new places of assembly with an occupant load exceeding 150 persons.	Removes the intervention of non-automatic notification due to unreliability - all fire alarm system notifications in all occupancies are required to be automatic	Increase in Cost	Safety
NFPA-101	12.4.1-12.4.1.5.7	Life Safety Evaluation	Provisions related to Life Safety Evaluations expanded extensively.		Increase in Cost	Safety, Procedural/Administrative

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	12.7.6.1(1)		Exception to required crowd managers for religious worship facilities reduced from 2000 occupant load to 500 occupant load		Increase in Cost	Safety
NFPA-101	13.2.5.6.8		New provisions for Aisle Landings		Increase in Cost	Safety
NFPA-101	13.2.5.6.9.5		New handrail provisions for aisle transition stairs		Increase in Cost	Safety
NFPA-101	13.2.5.6.9.6		New handrail provisions for aisle transition stairs		Increase in Cost	Safety
NFPA-101	13.4.1-13.4.1.5.7		Provisions related to Life Safety Evaluations expanded extensively.		Increase in Cost	Safety
NFPA-101	13.7.6.1(1)		Exception to required crowd managers for religious worship facilities reduced from 2000 occupant load to 500 occupant load		Increase in Cost	Safety
NFPA-101	13.7.6.3-13.7.6.5		Expanded requirements for Crowd Managers.		Increase in Cost	Safety
NFPA-101	14.3.4.3.1.2		New provision requiring emergency voice alarm communication fire alarm system in buildings having an occupant load exceeding 100 occupants.		Increase in Cost	Safety
NFPA-101	14.3.4.3.1.3	fire alarm with dual purpose paging	Provision permitting fire alarm system to be utilized for other purposes deleted.	14.3.4.3.1.4- lessens the restrictions on emergency paging systems to be used for non-emergency purposes	Increase in Cost	Safety

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	14.3.4.4.1	carbon monoxide coverage	New requirement to provide carbon monoxide alarms or detectors in specific locations	This is also related to a recent statutory requirement	Increase in Cost	Safety
NFPA-101	16.1.3.2		Reference to new provision permitting Atrium wall to serve as part of the separation between occupancies.		Decrease in Cost	Flexibility
NFPA-101	16.3.4.6.1	elimination of carbon monoxide units	New provision clarifying which buildings carbon monoxide alarms are required in.	I do not see this	Decrease in Cost	Flexibility
NFPA-101	16.6.2.6.2		Removed provision limiting the travel distance between any room door intended as an exit access and an exit to 100 feet.		Decrease in Cost	Flexibility, Permissiveness
NFPA-101	15.3.6(6)	self-closing doors	New provision exempts corridor doors from requirement to be self-closing where a fire alarm system is provided.	Compromise to accommodate a condition found in numerous existing schools and address the problem of using door checks to keep doors open in non-AC buildings with poor ventilation		cost savings, Safety, Flexibility

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	17.3.4.5.1	elimination of smoke alarms	New exception to omit the installation of smoke alarms, where they were not required in previous code editions.	Permits the omission of system smoke detectors in certain locations where there are local smoke alarms AND system heat detectors in existing locations	Decrease in Cost	Flexibility
NFPA-101	17.3.4.6.1	elimination of carbon monoxide units	New provision clarifying which buildings carbon monoxide alarms are required in.	(Could not locate this section)	Decrease in Cost	Increase Permissiveness
NFPA-101	17.6.3.4.4	permitted use of battery operated smoke alarms	Reserved provision permitting the use of battery-operated smoke alarms.	Fire service finds that this is not an acceptable arrangement due to compliance issues and the inherent unreliability of relying on the occupants to test, maintain and replace batteries	Increase in Cost	Safety
NFPA-101	17.6.3.4.5	elimination of carbon monoxide units	New provision clarifying which buildings carbon monoxide alarms are required in.	Base code only covers new occupancies - fire service requested existing occupancies be provided with the same level of protection	Decrease in Cost	Flexibility, cost savings, Increase Permissiveness
NFPA-101	20.2.4.3	egress door requirements	Provision requiring a patient care suite of rooms greater than 2,500 square feet to have two exit access doors deleted.	This clarifies the requirement for 2 exits applies notwithstanding the size of the suite	Decrease in Cost	Flexibility

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	21.2.4.3	egress door requirements	Provision requiring a patient care suite of rooms greater than 2,500 square feet to have two exit access doors deleted.	This clarifies the requirement for 2 exits applies notwithstanding the size of the suite	Decrease in Cost	Increase Permissiveness
NFPA-101	24.6.2.1.1.1	garage smoke/heat detection	New requirement for the installation of a smoke alarm or heat alarm to be provided in attached garages of new homes.	Requested due to high risk of garage fires - this was in prior editions of the code and was deleted inadvertently. Applies only to attached garages and only in new construction	Increase in Cost	Procedural/Administrative, Safety
NFPA-101	25.2.1.1	common area smoke alarms	New requirement for smoke alarms in common areas which was not in the previous edition of the code. The edition prior to the last did have a similar requirement.	Requested due to high risk of common area fires - this was in prior editions of the code and was deleted for reasons unknown. Applies only to new construction		Procedural/Administrative, Safety
NFPA-101	25.2.1.2	interconnection of smoke alarms	New requirement for smoke alarms in common areas which was not in the previous edition of the code. The edition prior to the last did have a similar requirement.	Industry standard - SAA		Safety
NFPA-101	25.2.1.3.1	carbon monoxide units at specific locations	New provision clarifying where carbon monoxide alarms are required.	Industry standard for all occupancies	Decrease in Cost	Flexibility, increase permissiveness

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	25.2.1.5	carbon monoxide units at specific locations	New provision permitting the use of hardwired devices with wireless interconnection technology.	Related to a statutory requirement	Decrease in Cost	Flexibility, New Materials/Technology
NFPA-101	26.3.6.1		Exception to installation of a sprinkler system in certain buildings deleted.		Decrease in Cost	Flexibility
NFPA-101	28.1.3.3		Reference to new provision permitting Atrium wall to serve as part of the separation between occupancies.		Decrease in Cost	Flexibility
NFPA-101	28.7.7		New requirement for door openings to be inspected annually.		Increase in Cost	Safety
NFPA-101	29.1.3.3		Reference to new provision permitting Atrium wall to serve as part of the separation between occupancies.		Decrease in Cost	Flexibility
NFPA-101	29.7.7		New requirement for door openings to be inspected annually.		Increase in Cost	Safety
NFPA-101	30.3.5.4	Sprinkler requirement in bathrooms	New exception to providing sprinklers in certain bathrooms.	Corrects an error in the 2013 edition of NFPA 13 that has since been reinstated	Decrease in Cost	Increase Permissiveness
NFPA-101	30.6		Requirement for certain apartment buildings to be inspected annually deleted from the code.		Decrease in Cost	Procedural/Administrative

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	30.7.3		New requirement for door openings to be inspected annually.		Increase in Cost	Safety
NFPA-101	31.3.5.4	Sprinkler requirement in bathrooms	New exception to providing sprinklers in certain bathrooms.	Corrects an error in the 2013 edition of NFPA 13 that has since been reinstated	Decrease in Cost	Flexibility
NFPA-101	31.6		Requirement for certain apartment buildings to be inspected annually deleted from the code.		Decrease in Cost	Procedural/Administrative
NFPA-101	31.7.3		New requirement for door openings to be inspected annually.		Increase in Cost	Safety
NFPA-101	32.2.1.4		New provisions permitting multiple levels of exit discharge in certain situations.		Decrease in Cost	Flexibility
NFPA-101	32.3.3.8.3	Kitchen Requirements	New provisions for cooking facilities which mirror those in healthcare occupancies.	Recognizes the move away from the institutional model to a more household-like model for common area kitchens for resident use provided that the number of persons that meals are cooked for is limited	Increase in Cost	Safety

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	33.3.3.8.2	kitchen requirements	New provisions for cooking facilities which mirror those in healthcare occupancies.	Recognizes the move away from the institutional model to a more household-like model for common area kitchens for resident use provided that the number of persons that meals are cooked for is limited	Increase in Cost	Safety
NFPA-101	36.3.2.3		The term commercial cooking operations was added and the exception for portable equipment not flue-connected was removed.		Increase in Cost	Safety, Technical
NFPA-101	36.4.4.3.7		Requirement for exit access path parallel to tenant fronts removed from code.		Unknown	Procedural/Administrative
NFPA-101	36.4.5.3		Deletion of reference to NFPA 1124, based on NFPA's retraction of all codes regulating consumer fireworks.		Decrease in Cost	Technical
NFPA-101	36.7.7		New requirement for door openings to be inspected annually.		Increase in Cost	Safety
NFPA-101	37.1.3.1.3		Reference to new provision permitting Atrium wall to serve as part of the separation between occupancies.		Decrease in Cost	Flexibility
NFPA-101	37.4.4.3.7		Requirement for exit access path parallel to tenant fronts removed from code.		Unknown	Procedural/Administrative

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	37.4.5.3(8)		Deletion of reference to NFPA 1124, based on NFPA's retraction of all codes regulating consumer fireworks.		Decrease in Cost	Technical
NFPA-101	37.4.6		Deletion of reference to NFPA 1124, based on NFPA's retraction of all codes regulating consumer fireworks.		Decrease in Cost	Technical
NFPA-101	37.4.6		New provision referencing core chapter for alcohol-based hand-rub dispensers			Procedural/Administrative
NFPA-101	37.7.7		New requirement for door openings to be inspected annually.		Increase in Cost	Safety
NFPA-101	38.1.3.3		New provisions permitting multiple levels of exit discharge in certain situations.		Decrease in Cost	Flexibility
NFPA-101	38.3.2.3		The term commercial cooking operations was added and the exception for portable equipment not flue-connected was removed.		Increase in Cost	Safety
NFPA-101	39.1.3.3		New provisions permitting multiple levels of exit discharge in certain situations.		Decrease in Cost	Flexibility

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	39.3.2.3		The term commercial cooking operations was added and the exception for portable equipment not flue-connected was removed.		Increase in Cost	Safety
NFPA-101	39.3.4.1(1)		Changes requirement for where a fire alarm system is required from three or more story building to three or more story business occupancy.		Decrease in Cost	Procedural/Administrative
NFPA-101	39.7.7		New requirement for door openings to be inspected annually.		Increase in Cost	Safety
NFPA-101	40.1.2.1.3(1)		New provision clarifying that occupancies exceeding the MAQs in the Fire Code are considered high hazard industrial occupancies.		Increase in Cost	Technical, Procedural/Administrative
NFPA-101	40.2.6.2		New provision permitting 400 feet of travel distance in power generation buildings.		Decrease in Cost	Flexibility
NFPA-101	40.4.1		New provision requiring compliance with section 11.7 for underground structures.			Technical
NFPA-101	40.7.3		New requirement for door openings to be inspected annually.		Increase in Cost	Safety,
NFPA-101	42.4.1		New provision requiring compliance with section 11.7 for underground structures.		Increase in Cost	Safety, Procedural/Administrative

Code	Citation	Brief Description	Difference between codes	Background/Reasoning	Increase/ Decrease	Benefits
NFPA-101	42.9.3		New requirement for door openings to be inspected annually.		Increase in Cost	Safety