

General Stakeholder Workgroup Meetings

June 7-15, 2022

9:00 a.m. Each Day

Virtual Meeting: <https://vadhcd.adobeconnect.com/va2021cdc/>

AGENDAS

June 14, 2022

(Begin at 9:00 am)

VRC Proposals

1. RB113.1-21
2. RB116.1-21
3. RB202-21
4. RB302.13-21
5. RB308.7-21
6. RB310.2.1-21
7. RB313.1-21
8. RB313.1(2)-21
9. RB313.1(3)-21
10. RB315.3-21
11. RB326-21
12. RB330.1-21

General Stakeholder Workgroup Meeting Descriptions (Subject Groupings)

VCC: Virginia Construction Code (USBC Part I) including USBC Part I administrative provisions; IBC; VCS; VADR; IBSR; and MHSR (**Proposal Designations in cdpVA:** B; BF; IB; MH; CS; AD)

VEBC: Virginia Existing Building Code (USBC Part II) including USBC Part II administrative provisions; and IEBC (**Proposal Designations in cdpVA:** EB)

Energy: All technical energy provisions of the VCC, IECC and IRC; does not include administrative provisions (**Proposal Designations in cdpVA:** EC; REC)

VMC: Virginia Maintenance Code (USBC Part III) including USBC Part III administrative provisions (**Proposal Designations in cdpVA:** PM)

SFPC: Virginia Statewide Fire Prevention Code including SFPC administrative provisions (**Proposal Designations in cdpVA:** FP)

VRC: Residential technical provisions of the VCC and the IRC; does not include administrative or trades provisions (**Proposal Designations in cdpVA:** RB)

Trades: All technical trade provisions (mechanical, electrical, plumbing and fuel gas), including residential trade provisions, of the VCC, IRC, IPC, IMC, and IFGC; does not include administrative provisions (**Proposal Designations in cdpVA:** M; P; E; RE; RM; RP)

2021 cdpVA Proposal Subject Matter Designations (cdpVA Proposal Name “Agenda Number” Prefixes)

The following prefixes will be utilized as part of each proposal name to assist in identifying the subject matter of the proposal. DHCD staff assign proposal names after they have been submitted, reviewed and before they are placed in “Ready for Public Comment” status.

B = Virginia Construction Code
EB = Virginia Existing Building Code
PM = Virginia Maintenance Code
FP = Statewide Fire Prevention Code
BF = Virginia Construction Code IFC
EC = Virginia Energy Conservation Code
M = Virginia Mechanical Code
P = Virginia Plumbing Code
E = VCC Electrical
RB = Virginia Residential Code
REC = Virginia Residential Code Energy
RE = Virginia Residential Code Electric
RM = Virginia Residential Code Mechanical
RP = Virginia Residential Code Plumbing
IB = Industrialized Building Safety Regulations
MH = Manufactured Home Safety Regulations
AD = Virginia Amusement Device Regulations
CS = Virginia Certification Standards

Example: cdpVA Proposal Agenda Number “**RM**2301.1-21” indicates a proposal to the mechanical provisions (VRC Section M2301.1) of the 2021 Virginia Residential Code.

RB113.1-21

VRC: 113.3

Proponents: KC Bleile (kc.bleile@viridiant.org)

2018 Virginia Residential Code

Revise as follows:

113.3 Minimum inspections. The following minimum inspections shall be conducted by the building official when applicable to the construction or permit:

1. Inspection of footing excavations and reinforcement material for concrete footings prior to the placement of concrete.
2. Inspection of foundation systems during phases of construction necessary to assure compliance with this code.
3. Inspection of preparatory work prior to the placement of concrete.
4. Inspection of structural members and fasteners prior to concealment.
5. Inspection of electrical, mechanical and plumbing materials, equipment and systems prior to concealment.
6. Inspection of energy provisions and conservation material prior to concealment.
7. Final inspection.

Reason Statement: The intent of this proposal is to clarify existing 2018 Virginia Residential Code Minimum Inspections found in Chapter 1 to aid in Building Code Official enforcement.

Resiliency Impact Statement: This proposal will increase Resiliency
This proposal will strengthen home resilience as it clarifies the minimum inspections related to energy code provisions.

Cost Impact:
None to builder as related to Building Code Official enforcement of existing code.

RB116.1-21

Proponents: Andrew Clark (aclark@hbav.com)

2018 Virginia Residential Code

Revise as follows:

116.1 General; when to be issued. Prior to occupancy or change of occupancy of a building or structure, a certificate of occupancy shall be obtained in accordance with this section. The building official shall issue the certificate of occupancy within ~~five~~ two working days after approval of the final inspection and when the building or structure or portion thereof is determined to be in compliance with this code and any pertinent laws or ordinances, or when otherwise entitled.

Exceptions:

1. A certificate of occupancy is not required for an accessory structure as defined in the IRC.
2. A new certificate of occupancy is not required for an addition to an existing Group R-5 building that already has a certificate of occupancy.

Reason Statement: Proposal would require local building officials to issue a C.O. within *two* working days after approval of the final inspection - currently, the code requires building officials to issue the C.O. within *five* working days. Proposal does not eliminate/reduce any inspection requirements; it simply expedites the timeframe for builders and homebuyers to receive their C.O.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal will not increase or decrease the cost of construction, but may help builders/homebuyers meet closing deadlines

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: RB116.1-21

This proposal doesn't have any public comments.

RB202-21

Proponents: Resiliency Sub-Workgroup

2021 International Residential Code

Revise as follows:

FLOOD HAZARD AREA. The greater of the following two areas:

1. The area within a floodplain subject to a 1-percent or greater chance of flooding in any given year (also known as the 100-year floodplain).
2. The area designated as a flood hazard area on a community's flood hazard map, or otherwise legally designated, including areas shown in either the *Flood Insurance Study* or on the *Flood Insurance Rate Map (FIRM)* and including areas added to account for future flooding conditions based on the locally adopted sea level rise projected to occur by 2070.

R322.1.5 Lowest floor. The lowest floor shall be the lowest floor of the lowest enclosed area, including *basement*, and excluding any unfinished flood-resistant enclosure that is useable solely for vehicle parking, building access or limited (200 square feet or less) storage provided that such enclosure is not built so as to render the building or structure in violation of this section.

R322.1.8 Flood-resistant materials. Building materials and installation methods used for flooring and interior and exterior walls and wall coverings below the elevation required in Section R322.2 or R322.3 shall be flood damage-resistant materials that conform to the provisions of FEMA TB-2 and ASCE 24.

R322.2 Flood hazard areas (including A Zones). Areas that have been determined to be prone to flooding and that are not subject to high-velocity wave action shall be designated as flood hazard areas. Flood hazard areas that have been delineated as subject to wave heights ~~between greater than or equal to 1½ feet (457 mm) and 3 feet (914 mm)~~ or otherwise designated by the *jurisdiction* shall be designated as either Coastal A Zones or V, VE or V1-30 Zone and are subject to the requirements of Section R322.3. Buildings and structures constructed in whole or in part in flood hazard areas shall be designed and constructed in accordance with Sections R322.2.1 through R322.2.4.

R322.3.1 Location and site preparation.

1. New buildings and buildings that are determined to be substantially improved pursuant to Section R105.3.1.1 shall be located landward of the reach of mean high tide.
2. For any alteration of sand dunes and mangrove stands, the *building official* shall require submission of an engineering analysis and a satisfactory Comment Document from FEMA for a Conditional Letter of Map Revision (CLOMR) that demonstrates that the proposed alteration will not increase the potential for flood damage.

R322.3.6 Enclosed areas below required elevation. Enclosed areas below the design flood elevation required in Section R322.3.2 are prohibited in Coastal A and Coastal High Hazard Areas shall be used solely for parking of vehicles, building access or storage.

R322.3.10 Tanks. ~~Underground tanks are prohibited in Coastal A or Coastal High Hazard Areas shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood.~~ Above-ground tanks shall be installed at or above the design flood elevation required in Section R322.3.2. Where elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of Section R322.3.

2018 Virginia Residential Code

Revise as follows:

R322.2.1 Elevation requirements.

1. Buildings and structures in flood hazard areas, including flood hazard areas not designated as Coastal A Zones, shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including *basement*) elevated to a height above the highest adjacent *grade* of not less than the depth number specified in feet (mm) on the FIRM plus 1 foot (305 mm), or not less than 3 feet (915 mm) if a depth number is not specified.
3. Basement floors that are below *grade* on all sides shall be elevated to or above base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
4. Garage and carport floors shall comply with one of the following:
 - 4.1 They shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.
 - 4.2 They shall be at or above *grade* on not less than one side. Where a garage or carport is enclosed by walls, the garage or carport shall be used solely for parking, building access or storage and the walls shall be constructed of flood resistant materials.

Exception: Enclosed areas below the elevation required by this section, including *basements* with floors that are not below *grade* on all sides, shall meet the requirements of Section R322.2.2.

Reason Statement: These proposed code changes were developed by the Resiliency Sub-Workgroup. The definition for FLOOD HAZARD AREA is being added to the residential code to correlate with the commercial code.

R322.1.5 provides a quantifiable limit to "limited storage"

R322.1.8 incorporates a reference to ASCE 24

R322.2 incorporates coastal V, VE and V1-30 Zones into jurisdictional designation of flood hazard areas

R322.3.1 requires a CLOMR from FEMA for any disturbance or alteration to sand dunes

R322.3.6 prohibits enclosed areas below the design flood elevation in Coastal A and Coastal High Hazard areas

R322.3.10 prohibits underground storage tanks in Coastal A and Coastal High Hazard Areas

R322.2.1 requires walls of garages and carports to be constructed of flood resistant materials when located in Flood Hazard Areas

Cost Impact: The code change proposal will increase the cost of construction. This proposal may have a marginal increase in the cost of construction when garages and carports are constructed in flood hazard areas.

Resiliency Impact Statement: This proposal will increase Resiliency

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RB202-21

This proposal doesn't have any public comments.

RB302.13-21

Proponents: Andrew Milliken (amilliken@staffordcountyva.gov)

2018 Virginia Residential Code

Revise as follows:

R302.13 Fire protection of floors. ~~(Section deleted.)~~

Floor assemblies that are not required elsewhere in this code to be fire-resistance rated, shall be provided with a 1/2-inch (12.7 mm) gypsum wallboard membrane, 5/8-inch (16 mm) wood structural panel membrane, or equivalent on the underside of the floor framing member. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, or other approved equivalent sprinkler system.
2. Floor assemblies located directly over a crawl space not intended for storage or for the installation of fuel-fired or electric-powered heating appliances.
3. Portions of floor assemblies shall be permitted to be unprotected where complying with the following:
 - 3.1. The aggregate area of the unprotected portions does not exceed 80 square feet (7.4 m²) per story.
 - 3.2. Fireblocking in accordance with Section R302.11.1 is installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.

Reason Statement: This proposal simply seeks to restore the 2021 International Residential Code regarding the protection of floor assemblies which was deleted from the VRC when initially introduced in the 2012 IRC. The code compliance solutions for section R302.13, have come a long way since the original requirement in R501.3 of the 2012 International Residential Code. New equivalency paths, and even a new ASTM E119 standard have been developed to support the implementation of this section. None of these new developments have been considered in Virginia since it was originally deleted from the 2012 VRC. This section was found to be a common ground for a number of partner agencies on the national level and is paramount to ensuring the safety of occupants and first responders. It should be reconsidered once again in Virginia, particularly where homes are not required to be equipped with a fire sprinkler system. This proposal is to simply follow the 2021 IRC regarding this section and all the exceptions or equivalencies afforded by the current model code language.

"The American Wood Council partnered with the International Association of Firefighters, International Association of Fire Chiefs, and the National Association of Homebuilders, to develop a code change that was included in the 2012 edition of the International Residential Code (IRC). The IRC requires floor framing members to be protected with a membrane consisting of either 1/2-inch gypsum wallboard, 5/8-inch wood structural panel (plywood, oriented-strand board [OSB] or composite panels), or equivalent. There are exceptions to the requirement for fire protection of floors, as described in Section R302.13 of the 2021 IRC. These exceptions include: 1) floor assemblies over an area protected by a sprinkler system, 2) floor assemblies located directly over a crawl space not intended for storage or heating appliances, 3) small areas up to 80 ft² of the floor assembly separated from the remainder of the floor assembly by fireblocking, and 4) floor assemblies framed with dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance. A new ASTM standard was recently published, which provides a consistent and clear methodology for determining equivalent fire performance of floors when subjected to an ASTM E119 fire exposure. A reference to ASTM D8391 – Standard Specification for Demonstrating Equivalent Fire Performance for Wood-Based Floor Framing Members to Unprotected 2 by 10 Dimension Lumber or Equal-Sized Structural Composite Lumber has been submitted for consideration..." - American Wood Council *Woodpost* 2.21.22

"...basement fires present significant safety issues for firefighters. An Underwriters Laboratory (UL) study in conjunction with the National Institute of Standards and Technology (NIST) established the universal instability of all types of floor construction during a basement fire. There are no reliable and repeatable warning signs of collapse, and there is no way to know when it is safe to operate on top of a basement fire.6 In addition to unpredictable changes in flow paths, other aspects of basements that pose threats to firefighters include limited access, cluttered storage, and nonstandard room and furnishings arrangement." - United States Fire Administration, *One- and Two-Family Residential Building Basement Fires*, March 2015.

"The change addresses concerns for firefighter safety and incidents of injury or death to firefighters while fighting residential fires due to the collapse of floors. The application of gypsum wallboard or other approved material intends to provide some protection to the floor system against the effects of fire and delay collapse of the floor. This provision primarily is aimed at light-frame construction consisting of I-joists, manufactured floor trusses,

cold-formed steel framing, and other materials and manufactured products considered most susceptible to collapse in a fire." - International Code Council, IRC Significant Changes page 69-70.

<https://www.apawood.org/Data/Sites/1/documents/fireprotection/basis-of-irc-membrane-protection-provisions.pdf>

<https://www.cdc.gov/niosh/docs/wp-solutions/2009-114/pdfs/2009-114.pdf?id=10.26616/NIOSH PUB2009114>

<https://westfordma.gov/DocumentCenter/View/51/I-Joist-Floor-Protection-Systems-PDF>

https://d1qi3fvbl0xj2a.cloudfront.net/files/2021-07/2009_NIST_ARRA_Compilation_Report.pdf

http://media.iccsafe.org/news/eNews/2013v10n4/2012_irc_sigchanges_p69-70.pdf

<https://www.usfa.fema.gov/downloads/pdf/statistics/v15i10.pdf>

Cost Impact: The code change proposal will increase the cost of construction

This proposal is expected to increase the cost of construction within Virginia as this section has been previously deleted. Since the section was originally deleted in the 2012 edition, significant options and equivalencies have been developed to reduce the cost of compliance. The proposal is simply to follow the model code for this section which is already in effect in surrounding states.

Resiliency Impact Statement: This proposal will increase Resiliency

This proposal increases the resiliency of residential construction by enhancing the fire protection afforded to exposed floor assemblies.

Attached Files

- **Wooden I-joist Failure - DSC_0074.pdf**
<https://va.cdpassess.com/proposal/999/1557/files/download/673/>

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: RB302.13-21

This proposal doesn't have any public comments.

RB308.7-21

Proponents: William Penniman (wpenniman@aol.com)

2021 International Residential Code

Add new text as follows:

R308.7 Bird-Friendly Construction.

All fenestration and other exterior glazing of new residential buildings or supplementary structures (such as garages, sheds or greenhouses) shall use Bird-Friendly Glass as defined in section R308.7.1

308.7.1 Definitions for Bird-Friendly Glazing. For purposes of Section R308.7,

A. "Bird-Friendly Glass" means glass, other glazing materials or obstructed glass that meet any of the following conditions:

a. Frosted or opaque glass or glass with exterior surface (surface 1) obstructed and effectively covered by building-integrated structures that do not have gaps larger than 12" in any dimension, including metal screens, non-glass double-skin facades, fixed solar shading, exterior insect or solar screens, grilles, child-guards and other features that meet these conditions.

b. Un-tinted glass with an outer total reflectance of $\leq 15\%$ that contains a pattern of visual markers that conforms to the following rules: (i) dots or other isolated solid shapes that are $\geq \frac{1}{4}$ " in diameter and are either \leq two-inches (2") apart in horizontal lines and \leq four-inches (4") apart in vertical lines or \leq two-inches apart in any direction if randomly distributed or (ii) horizontal lines that are $\geq \frac{1}{8}$ " in width and spaced ≤ 2 " apart or vertical lines that are $\geq \frac{1}{8}$ " in width and spaced ≤ 4 " apart.

c. Any product with a Threat Factor Rating of 30 or less as determined and published by the American Bird Conservancy.

B. "Glazing" means all glass, including spandrel glass, as well as any other materials, including but not limited to: plexiglass, polished metal, or materials that are transparent or highly reflective

Chapter 44 Referenced Standards . Add:

ABC American Bird Conservancy

Reason Statement: This proposal is supported by the Audubon Society of Northern Virginia.

Collisions with buildings kill up to 1 billion birds per year in the United States primarily due to the "invisibility" of clear glass to birds and due to reflections that appear to be attractive places to fly. <https://abcbirds.org/glass-collisions/why-birds-hit-glass/> This high annual loss of birds to building collisions has contributed to the significant decline that has been recorded in many bird populations during recent decades. The danger to birds exists throughout the principle "bird activity zone" up to 100 feet above grade where both local flights and migrations occur. Most collisions actually occur with glass on homes and low-rise buildings because of the prevalence of such buildings, but taller buildings, though less common, pose a greater danger on a per-building basis. <https://abcbirds.org/glass-collisions/why-birds-hit-glass/> The amount of glass is the strongest predictor of bird collisions. <https://abcbirds.org/glass-collisions/architecture-planning/> Clear glass is a threat whether it is part of the building envelope or an extension of glass above the building walls or incorporated into skyways or balconies or even smaller auxiliary structures. Bird-friendly solutions may involve building design, the glass itself (e.g., frits or printed patterns, coatings, frosting) or physical structures (as simple as window screens, grilles, shades or less glazing), <https://abcbirds.org/glass-collisions/architecture-planning/> ("Bird Friendly Design Guide"); <https://abcbirds.org/glass-collisions/why-birds-hit-glass/>; <https://abcbirds.org/glass-collisions/photo-gallery/>; <https://www.collidescape.org/> As illustrated by the Javits Center window replacement, the choice of bird-friendly glass can reduce collisions by over 90%. <https://abcbirds.org/glass-collisions/architecture-planning/>

The range of bird-friendly glazing and design is growing as architects, builders and glass companies make concerted efforts to minimize building threats to birds. <https://abcbirds.org/glass-collisions/products-database/>; <https://nationalaudubon.app.box.com/s/lmf7vijbohuds6i92iqz11dzy8398ckj>; <https://www.featherfriendly.com/residential>; <https://www.featherfriendly.com/commercial?hsLang=en>; <https://www.birdsavers.com/>; <https://www.windowfilms.ca/window-film-products/feather-friendly/>; <https://www.conveniencegroup.com/featherfriendly/feather-friendly>; <https://www.walker-glass.com/resources/bird-safe-glass/>

A simple rule is the "2X4" standard: the 2 x 4 Rule is defined as a collision deterrence module based upon the physical profile of a bird in flight. Current research has established maximum module dimensions of 2" high x 4" wide. Some solutions, such as films meeting the 2X4 standard, can be applied to windows and effectively reduce collisions. The American Bird Conservancy maintains and continuously updates a list of bird-friendly materials, which can be used for compliance in order to provide flexibility for builders and architects. The ABC rates products based on the hazard they pose for birds ("Threat Factor"). <https://abcbirds.org/glass-collisions/threat-factor-rating/> The data base is available in printed form or found at <https://abcbirds.org/glass-collisions/products-database/>; www.birdsmartglass.org. As of November 2021, there were nearly 120 bird-friendly products that had been tested and found to pass the ABC's "threat" standard.

Government bodies have begun to address these issues with mandatory standards for bird-friendly construction and frequently use the ABC Threat Factor Ratings to assess proposed building solutions (e.g., NYC and GSA).

Depending on designs and materials chosen, the solutions may be essentially invisible to occupants (e.g., UV patterns) or fit with the overall design pattern (e.g., insect screens on windows) or be such (e.g., frits) that occupants quickly get used to and see beyond the patterns.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposed building code standards may, but need not, increase building costs. See <https://abcbirds.org/glass-collisions/architecture-planning/> ("Bird Friendly Design Guide": "New construction can incorporate from the beginning bird-friendly design strategies that are cost neutral.").

Some approaches can raise costs of construction. However, some solutions, such as insect screens, are already commonly installed on most residential windows. To the extent window screens would be installed to cover windows anyway, no additional costs would be incurred.

Design decisions for new buildings can also mitigate or eliminate increased costs. For example, design changes to reduce the glass areas can result in mitigate construction costs and also save energy costs with a more efficient building envelope. Many non-glass solutions, such as screens, paracords, window films, tape or less glass, are inexpensive and have other benefits. The range of options is expanding and do little to inhibit outdoor viewing.

Even if construction costs were raised by substituting Bird-Friendly Glass for traditional glass, the costs would potentially be very small relative to the total cost of the building. The benefits from protecting our natural heritage from avoidable bird deaths outweigh the incremental construction costs.

Resiliency Impact Statement: This proposal will increase Resiliency

This proposal will enhance the resiliency of both local and migratory birds, which are currently threatened by impacts to windows and other glazing of buildings. Buildings are the second leading cause of death to birds with up to 1 billion birds killed annually by striking buildings, mainly windows.

The problem exists for both residential and commercial buildings, including low-rise buildings. Bird populations have declined substantially in the United States in the past 50 years. Buildings have been significant contributors to the population decline.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RB308.7-21

This proposal doesn't have any public comments.

RB310.2.1-21

VRC: R310.2.1

Proponents: Michael Eutsey (mikeeutsey@yahoo.com); Richard Gordon (rtgordon@hanovercounty.gov); Thomas Cash (trcash@hanovercounty.gov)

2018 Virginia Residential Code

Revise as follows:

R310.2.1 Minimum opening area. Emergency and escape rescue openings shall have a net clear opening of not less than 5.7 square feet (0.53 m²). The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the ~~inside, including inside, including including the tilting or removal of the sash as the normal operation.~~ The net clear height opening shall be not less than 24 inches (610 mm), and the net clear width shall be not less than 20 inches (508 mm).

Exception: *Grade* floor or below-*grade* openings shall have a net clear opening of not less than 5 square feet (0.465 m²).

Reason Statement: The way this section is currently written to allow the removal of the upper sash it does not comply with the requirements of R310.1. R310.1.1 states that Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools, or special knowledge. In order to remove a sash to obtain the required opening size a person must know how to operate the latches and also how far to the sash must be moved prior to taking it out. A person that is not familiar with the "normal operation" of that window may waste valuable time trying to get out. In this current time where sprinklers are what folks are asking for to give an occupant a little more time to get to safety this change would also help by saving time trying to figure out how to remove an upper sash while they are trying to escape a fire. Building Officials and Inspectors in VBCOA Region VII feel that the current code section lessens the safety requirements of the IRC.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction.

RB313.1-21

Proponents: Andrew Milliken (amilliken@staffordcountyva.gov)

2018 Virginia Residential Code

Revise as follows:

R313.1 Townhouse automatic fire sprinkler systems. ~~Notwithstanding the requirements of Section 103.3, where installed, an~~ An automatic residential fire sprinkler system for townhouses shall be designed and installed in accordance with NFPA 13D or Section P2904, installed in townhouses.

Exception: An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904 or NFPA 13D, 13, or 13R.

Reason Statement: This proposal is the same townhouse fire sprinkler requirement initially approved by the Board of Housing and Community Development during the 2018 Code Development Cycle. Recognizing that townhomes require homeowners to put their trust in their neighbors for fire safety, requiring fire sprinklers in townhomes provides active and built-in protection for homeowners against that risk for each townhome in the row.

Home fires are fast; sprinklers are faster. According to Underwriters Laboratories, modern home furnishing burn tests have measured the burn rates and times of older home furnishings, made up of materials using solid wood, wool and down, and compared them with today's home furnishings that contain mostly synthetic materials and electronics in addition to open-floor plans, larger homes and engineered lumber. The results? Today's home fires burn much faster, leaving less time for residents to get out of structures and posing new challenges for firefighters (www.youtube.com/watch?v=aDNPhq5ggoE).

Home fires are deadly; sprinklers save lives. According to National Fire Protection Association statistics for 2020, 74% of fire deaths occur in the home. Home fire sprinklers can save lives and property from fire. They respond quickly and effectively to fire, often extinguishing the fire before the fire department arrives. Only the sprinkler closest to the fire will activate, spraying water on the fire.

Homes need to be affordable; sprinklers are too. The national average for installing automatic fire sprinklers in new homes is \$1.35 per sprinklered square foot. Putting that figure in perspective, people pay similar amounts for carpet upgrades, whirlpool baths, or granite countertops.

MYTH: "A smoke alarm provides enough protection." FACT: Smoke alarms alert occupants to the presence of danger, but do nothing to extinguish the fire. Home fire sprinklers respond quickly to reduce heat, flames, and smoke from a fire, giving residents valuable time to get out safely. Having a working smoke alarm cuts the chances of dying in a reported fire in half. However, if you have a reported fire in your home, the risk of dying decreases by about 85% when sprinklers are present.

MYTH: "Newer homes are safer homes; the fire and death problem is limited to older homes." FACT: Age of housing is a poor predictor of fire death rates. Yes, new construction codes allow for tighter construction and better draft-stopped homes, which help slow the spread of fire. However, these safeguards have not completely mitigated the home fire problem. The majority of home fires are caused by candles, smoking materials, cooking, arcing, and other occupant-based activities. These types of fires happen in old and new construction alike. Moreover, new methods of construction negatively impact occupant and firefighter life safety under fire conditions. The National Research Council of Canada (NRC) tested the performance of unprotected floor assemblies exposed to fire. The findings of the study, "The Performance of Unprotected Floor Assemblies in Basement Fire Scenarios," assert that these structures are prone to catastrophic collapse as early as six minutes from the onset of fire. The same UL study found that the synthetic construction of today's home furnishings add to the increased risk by providing a greater fuel load. Larger homes, open spaces, increased fuel loads, void spaces, and changing building materials contribute to: faster fire propagation, shorter time to flashover, rapid changes in fire dynamics, shorter escape time, shorter time to collapse

MYTH: "Home fire sprinklers are expensive and will make housing unaffordable, especially for first-time buyers moving to our area." FACT: The fact is that home fire sprinklers are affordable. In 2013, the Fire Protection Research Foundation issued its updated Home Fire Sprinkler Cost Assessment report, which revealed that the cost of installing home fire sprinklers averages \$1.35 per sprinklered square foot for new construction. That's down from \$1.61 per sprinklered square foot that was in the Foundation's 2008 report. To put the cost of sprinklers into perspective, many people pay similar amounts for carpet upgrades, a paving stone driveway, or a whirlpool bath. Installing home fire sprinklers can help residents significantly reduce property loss in the event of fire, cut homeowner insurance premiums, and help support local fire service efforts.

MYTH: "We don't need sprinkler requirements; they can be installed in homes voluntarily." FACT: Fire sprinklers are a U.S. model building code requirement for all new, one- and two-family homes. If a new home is lacking this safety feature, it is not adhering to national model building codes, and should therefore be considered substandard. Adopting this requirement to sprinkler new homes provides a greater overall level of safety in communities. By requiring this technology, you are ensuring that a large number of residents can enjoy the same level of safety found in many offices, schools, apartments, and public buildings. Beyond the life-saving benefits of home sprinklers, there are other incentives; cities can reduce the strain on fire service personnel, limit damage to property, and help conserve municipal water resources by reducing the amount of water needed to fight fires.

MYTH: "Home fire sprinklers often leak or activate accidentally." FACT: Leaks from fire sprinklers are very rare. Scottsdale, Arizona, for instance, has had an ordinance for home fire sprinklers since 1986. According to NFPA's "U.S. Experience with Sprinklers" report, a

survey conducted there found that the majority of residents living in sprinklered homes had never experienced a leak or maintenance problem. The report also noted that sprinklers operated in 94 percent of home fires in which sprinklers were present and fires were considered large enough to activate them. They were effective at controlling the fire in 96 percent of fires in which they operated. In three of every five home fires in which sprinklers failed to operate, the system had been shut off.

MYTH: "If you want your home fire sprinklers to be reliable, they will need frequent, expensive maintenance." **FACT:** The standard design for home fire sprinklers is much simpler than the design for more traditional sprinklers used in commercial buildings. If you install home fire sprinklers, the only "inspection and maintenance" you need to do are simple tasks outlined by the Home Fire Sprinkler Coalition, including simple flow tests and visual inspections.

MYTH: "When a fire occurs, every sprinkler will activate and everything in the house will be ruined." **FACT:** In the event of a fire, typically, only the sprinkler closest to the fire will activate, spraying water directly on the fire, leaving the rest of the house dry and secure. Roughly 85 percent of the time, only one sprinkler activates during a fire.

MYTH: "The water damage caused by fire sprinklers will be more extensive than fire damage." **FACT:** Home fire sprinklers can significantly reduce property loss and damage due to a fire. The sprinkler will quickly control the heat and smoke from the fire, limiting damage to other areas of the house and giving residents valuable time to get out safely. Any resulting impact from the sprinkler will be much less severe than the damage caused by water from fire-fighting hose lines. Fire departments use up to eight-and-a-half times more water to extinguish a home fire as fire sprinklers would use to extinguish the same fire.

MYTH: "Home fire sprinklers are not practical in colder climates, as the pipes will freeze and cause water damage." **FACT:** With proper installation, home fire sprinklers will not freeze in cold settings. NFPA 13D, *Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, sets forth guidelines on proper insulation to avoid pipes freezing.

MYTH: "Home fire sprinklers are unattractive and will ruin the aesthetics of our residents' homes." **FACT:** New home fire sprinkler models are very unobtrusive, can be mounted flush with walls or ceilings, and can be concealed behind decorative covers.

MYTH: "Any time a smoke alarm goes off it will activate the home fire sprinklers." **FACT:** Each individual sprinkler is designed and calibrated to activate only during the heat from a fire. They do not operate in response to smoke, burned toast, cooking vapors, steam, or an activating smoke alarm.

<https://ul.org/new-demonstration-video-shows-you-only-have-three-minutes-escape-home-fire>

<https://www.nfpa.org/Public-Education/Staying-safe/Safety-equipment/Home-fire-sprinklers/Fire-Sprinkler-Initiative/Take-action/Free-downloads/Myths-vs-facts>

Cost Impact: The code change proposal will increase the cost of construction

According to a 2013 study by the Fire Research Foundation, the national average cost for installing a residential sprinkler system is \$1.35 per square foot or \$3,375 for a 2,500-square-foot home. A copy of that report is available at <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Suppression/HomeFireSprinklerCostAssessment2013.ashx>. With the average construction cost of a new home at \$114 per square foot in 2019, that's paying a little more than 1% of a home's value for 24/7 fire protection.

Resiliency Impact Statement: This proposal will increase Resiliency

This proposal will increase the minimum life safety infrastructure of new residential townhouses such that they are more resilient to the impact of fire. It ensures that fire sprinkler protection is built-in with each townhome and remains for the life span of the structure.

Attached Files

- **Fact Sheet - water supply.pdf**
<https://va.cdaccess.com/proposal/1134/1554/files/download/659/>
- **Fact Sheet - Townhouses.pdf**
<https://va.cdaccess.com/proposal/1134/1554/files/download/658/>

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus

None

Public Comments for: RB313.1-21

This proposal doesn't have any public comments.

Proposal # 1134

RB313.1(2)-21

Proponents: Glenn Dean

2018 Virginia Residential Code

SECTION R313 AUTOMATIC FIRE SPRINKLER SYSTEMS

Revise as follows:

R313.1 Townhouse automatic fire sprinkler systems. ~~Notwithstanding the requirements of Section 103.3, where installed, an~~ An automatic residential fire sprinkler system for townhouses shall be designed and installed in accordance with NFPA 13D or Section P2904, installed in townhouses.

Exception: An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing *townhouses* that do not have an automatic residential fire sprinkler system installed.

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for *townhouses* shall be designed and installed in accordance with Section P2904 or ~~NFPA 13D, 13, or 13R.~~ 13D.

R313.2 One- and two-family dwellings automatic fire sprinkler systems. ~~Notwithstanding the requirements of Section 103.3, where installed, a~~ An automatic residential fire sprinkler system shall be designed and installed in accordance with Section P2904 or NFPA 13D, 13 or 13R. one- and two-family dwellings.

Exception: An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential fire sprinkler system.

R313.2.1 Design and installation. Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or ~~NFPA 13D, 13 or 13R.~~ 13D.

Reason Statement: I'm submitting this to revert to model code language because the facts supporting a sprinkler requirement in NEW residential construction have not changed over the years, nor have the falsehoods against it. The facts and falsehoods need not be enumerated – again – in this supporting statement. We already know what they are and have for decades. Because of materials used, lightweight construction, density of housing and so on, newly constructed houses burn quickly making the incorporation of sprinklers more imperative. Having a residential sprinkler system provides time for occupants to vacate before untenable conditions are created as they would be without the presence of sprinklers. The fragility of the construction industry is nothing new either. It has been fragile for decades and will continue to fragile for years to come. The same with the increase of housing costs. That's not new. It's always gone up and will continue to go up. By comparison, what I can't understand is the sacrificial cost of a human life when compared to the now relatively insignificant cost of installing residential sprinklers in new construction.

Cost Impact: The code change proposal will increase the cost of construction
This code change might increase construction cost approximately one percent - OR LESS - particularly in light of the tradeoffs available.

Resiliency Impact Statement: This proposal will increase Resiliency
If construction resiliency means to reduce, respond, adapt or avoid a failure due to a destructive event such as a fire, then yes, this proposal will increase resiliency.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: RB313.1(2)-21

This proposal doesn't have any public comments.

Proposal # 1136

RB313.1(3)-21

Proponents: Jeffrey Shapiro (jeff.shapiro@intlcodeconsultants.com)

2018 Virginia Residential Code

Revise as follows:

R313.1 Townhouse automatic fire sprinkler systems. ~~An automatic sprinkler system shall be installed in townhouses. Notwithstanding the requirements of Section 103.3, where installed, an automatic residential fire sprinkler system for townhouses shall be townhouses designed and installed in accordance with NFPA 13D or Section P2904.P2904.~~

Exception Exceptions : 1. Townhouses containing no more than three townhouse units.

2. An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904 or NFPA 13D, 13, or 13R.

Reason Statement: This proposal provides a reasonable approach to providing fire safety in newly constructed Virginia townhouses, by including an option for townhouses with less than four units to be built without fire sprinklers. This exception specifically responds to concerns that have previously been raised in Virginia about the feasibility and cost of providing sprinklers in smaller townhouse projects and projects built in rural areas that lack a public water supply. Although 12 of the 13 states/DC that currently adopt the IRC requirement for townhouse sprinklers do not amend in an un-sprinklered unit threshold, and all of these states include the same types of rural and remote area that have been cited as being of concern in Virginia, it is hoped that this Virginia exception will provide a path that building officials, industry, and the fire service will view as reasonable and worthy of support.

Below is a list of considerations that are commonly discussed when reviewing adoption of the IRC's townhouse sprinkler requirement.

- 1. Precedence - Adopt the model code requirement:** This proposal will realign the Virginia Residential Code with the IRC by retaining the IRC requirement for fire sprinklers in new townhouses, as modified by an exclusion for less than 4 townhouse units. The IRC requirement was first published in the 2009 IRC and has been retained in the 2012, 2015, 2018, 2021, and 2024 editions of the code. Thirteen state-level code adoptions [California, District of Columbia, Hawaii, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New York (3+ stories above grade), Oklahoma, Pennsylvania, Washington (more than 4 units), Wisconsin] and numerous other jurisdictions, include the IRC townhouse sprinkler requirement. There is no evidence of negative impacts on home affordability or other detrimental issues associated with the adoption of townhouse sprinklers in any jurisdictions where the IRC requirement is in place.
- 2. Parity with the Virginia Building Code:** Section 903.2.8 of the Virginia Building Code requires all townhouses, regardless of height or area, to be sprinklered. There is no technical basis for requiring fire sprinklers to be installed under the Virginia Building Code yet exempt the same requirement under the Residential Code. It is the intent of the IRC and this proposal to provide equal protection to residents of all townhouses with four or more units, regardless of which code they are built under.
- 3. Increased fire risk associated with townhouses – They are multifamily occupancies:** Unlike detached homes, where an owner has direct control over personal safety, townhouses are multifamily structures that include many unrelated individuals and families living under a single roof. Clearly, there is no “owner’s choice” argument in the case of townhouses because the fire safety of at least two other families relies on the behavior of someone else who lives under the same roof, i.e. a neighbor’s accident, carelessness, or perhaps even unlawful activities such as a drug lab will impact your safety, your family’s safety, your pets’ safety (who may be home unattended when a fire occurs) and your property. There have been many incidents where a fire in one townhouse unit had catastrophic consequences on neighbors who had nothing to do with the cause of the fire. Residential fire sprinklers prevent such tragedies by keeping fires contained to the unit of origin, either controlling the fire or extinguishing it altogether. It is also worth noting that the National Fire Incident Reporting System codes townhouses as multifamily occupancies, separate from one- and two-family dwellings and recognizing that the risk associated with a townhouse fires is that of a multifamily occupancy.
- 4. Increased danger of residential fire behavior:** Research conducted by the National Institute of Standards and Technology and Underwriters Laboratories on residential fire behavior and the value of residential fire sprinklers to firefighter and occupant safety provides a technical basis for this recommendation. Research shows that the rate of fire growth in modern residential structures has increased, partly attributed to an increased heat release rate and an increased heat of combustion associated with modern synthetic materials used in household goods and furnishings. Faster fire growth in a multifamily structure means that occupants of adjacent units will be endangered more quickly than was the case with legacy furnishings
- 5. Increased risk to firefighters and demand on fire service resources from townhouses:** Townhouses place significantly increased demand on fire service resources as compared to detached dwellings. Townhouses increase the complexity of rescue operations, and firefighting is hampered because fire spread into adjacent units cannot be easily followed by firefighters from unit to unit. There are no access openings in party walls allowing firefighters to pass back and forth between opposite sides when fighting a fire. Furthermore, townhouses with four or more units, which are the focus of this proposal, tend to be large structures that create the potential for large fires. Wind-driven flames from an uncontrolled residential fire can bypass rated separations and result in fire extension to adjacent units and structures and are

challenging to emergency responders, particularly in rural areas served by diminishing volunteer and equipment resources.

6. **Sustainable housing and environmental impact:** In addition to life-safety and property protection attributes of fire sprinklers, research by FM Global has also verified the value of fire sprinklers in sustainable housing and protecting the environment from pollution associated with toxic smoke and contaminated runoff from manual firefighting. Of particular interest is the conclusion that a single fire event, in addition to destroying a townhouse, can offset the cumulative value of green construction and energy saving appliances, i.e. green efforts are negated if a fire occurs and sprinklers aren't installed as an insurance policy that remains ready to control it.
7. **Financial impact of townhouse sprinklers recognized by builders and cannot be equated to one- and two-family dwellings:** Arguments often conveyed by the building industry in opposition to residential sprinklers based on possible cost implications aren't relevant to townhouses because sprinklered townhouses can actually be less expensive to build than non-sprinklered townhouses. The difference is attributed to incentives that are offered by the IRC and the International Fire Code (IFC) for sprinklered properties. Unlike single family developments, where multiple builders might not be able to directly recoup the value of infrastructure incentives, townhouses are typically built in communities where the developer is the builder, so the cost reductions are directly realized. There's no better testament to this cost comparison than the fact that the IRC's townhouse sprinkler requirement was proposed (RB66-07/08) by a major national multifamily builder, Avalon Bay Communities, not the fire service or public safety interest group. Prior to the 2009 edition, the IRC didn't include an allowance to reduce the fire rating of townhouse separation walls from 2-hours to 1-hour, which had been permitted by the IBC. Avalon Bay Communities proposed adding the IBC wall reduction to the IRC with the quid pro quo of also adding the IBC's requirement to sprinkler all townhouses. Avalon Bay Communities knew that the cost savings associated with the reduced wall rating alone may equal or exceed the cost of installing sprinklers. When combined with other incentives offered by the IFC for access roads and water supply, the company knew that they could actually save money by sprinklering townhouses.
8. **Economic impact:** Installation costs for fire sprinklers in townhouses are offset by cost savings that can be realized in other aspects of construction. Cost incentives for townhouse development/buildings may include:
 1. Reduced material and labor costs associated with reductions in the required fire rating of townhouse separation walls from 2-hours to 1-hour. This incentive has an added benefit, particularly in the current market of tight material and labor supplies, of significantly reducing the amount of drywall that must be secured to construct a project and the associated challenge of securing labor resources to apply additional drywall layers needed to achieve a 2-hour assembly rating. In addition, Code Change RB67-19 resulted in a change to the 2021 IRC that permits sprinkler piping to penetrate and be routed in townhouse common walls. This can reduce sprinkler installation costs by allowing a single water supply for multiple sprinkler systems in a townhouse building, and by allowing sidewall sprinklers to be used as a means of improved coverage and avoid the need to install pipe in attic areas that might be subject to freezing.
 2. Reductions in minimum required water supply for firefighting, allowing for smaller water mains, and typically eliminating some fire hydrants.
 3. Somewhat unique to Virginia is an allowance in R310.1, Exception 1, which eliminates the IRC requirement to provide emergency escape and rescue openings for dwellings that are equipped with a fire sprinkler system. Accordingly, there is a significant design advantage with respect to allowing builders to use fixed glazing or windows that do not meet the minimum size and operability requirements of the IRC for escape openings. In addition, for townhouses, which typically have small fenced yards that may not easily connect to a public way, the elimination of escape and rescue openings can solve site layout issues by eliminating the need for accessways from yards to a public way. Additionally, eliminating escape window or door openings for basements deletes not only additional windows for sleeping rooms, but also the associated window well, escape ladder, fall protection for the window well opening and issues with sealing below-grade wall openings from water infiltration, and associated costs.
 4. Increased portion of roof area permitted to have solar panels (R324.6), which increases available solar generating capacity.
 5. Permissible area of a mezzanine increases from 1/3 of the floor area of the room with a mezzanine to 1/2 (R325.3). This permits increased design flexibility for a top-story mezzanine vs. having a 4th story in a townhouse, which falls out of the IRC scope and forces IBC compliance.
 6. Permissible enclosure of mezzanines in rooms not exceeding 2 stories above grade plane vs requiring openness to the room with walls not exceeding 36 inches in height (R325.5).

Many of these cost offsets relate to design options that are difficult to specifically quantify because they relate to unique architectural design features, such as the inclusion of mezzanines, or on local fire code requirements that are specific to individual jurisdictions. However, the cost offsets associated with permissible reductions in townhouse separations and unfinished basement floor-ceiling assemblies can be quantified.

To quantify these values, a calculation model was created using data from the Craftsman National Construction Estimator program. For the purpose of this submittal, four sample runs were performed on a sample townhouse using two wall types (back-to-back 1-hour walls in a non-sprinklered building vs. a staggered stud 1-hour wall in a sprinklered building) and two sprinkler installation costs (\$1.50/sqft and \$2.00/sqft). Although the NFPA published a report "Home Fire Sprinkler Cost Assessment – 2013" (attached) estimates a national average cost of \$1.35/sqft installation costs, the Virginia model runs used costs of \$1.50/sqft and \$2.00/sqft in an effort to be reasonably conservative, even though townhouse sprinkler systems may cost less than NFPA's estimated costs because there is an economy of scale in townhouse communities.

The sample townhouse building contains five units that are three stories tall with a pitched roof and dimensions 20ft x 30ft x 10ft floor-to-floor. Summary sheets for each run with full documentation of the wall designs and costs are available. Cumulative results for the four runs provided below. Each run includes a national average cost and four additional data point multipliers for unique communities. The value modifiers are based on cumulative average cost adjustments for labor and materials recommended by the Craftsman estimator, intended to provide a reasonable representation of costs in different areas.

It should be noted that builders often claim that reductions in the fire resistance of wall assemblies are not realistic because the 2-hour assemblies are needed for control of sound transmission. However, research on Sound Transmission Classes (STCs) of various wall designs indicates that this is not accurate. STC ratings are a measure of the effectiveness of partitions in reducing airborne sound transmission, with higher numbers having better performance in resisting sound transmission. For reference, there is no minimum in the IRC, but optional IRC Appendix K recommends a minimum of 45. The IBC requires a minimum STC of 50 by design or 45 by field test.

For the purpose of this analysis, two different types of 1-hour rated wall assemblies were evaluated and compared to a back-to-back set of 1-hour wall assemblies, sometimes used as a permissible alternate to a listed 2-hour assembly. STCs for these walls are reported as follows:

- Base level staggered stud 1-hour wall (one layer of insulation, which could be increased to 50-52 with modifications) – STC 45-48
- Base level double stud 1-hour wall (insulation in each stud channel) – STC 57
- Back-to-back 1-hour walls sometimes used as a 2-hr substitute (STC can be increased by adding additional insulating material in the space between the inner wall membranes at additional cost. Empty air space between these inner membranes actually reduces sound performance, which is why the base wall STC is not at high-performance level) – STC 45

Other wall designs with higher STC ratings can be modeled upon request if wall construction details are provided. To put the cost results into perspective of a monthly mortgage payment, a calculation was performed to evaluate the net cost of a \$2,000 price increase (the highest of costs in the four model runs) to a homeowner after reductions associated with homeowners insurance (assumed at 5% based on NAHB's insurance analysis for major carriers and which is a common reduction offered by insurers in many states for NFPA 13D protection) and income tax deductions (assumed at 24% Federal marginal rate and excluding Virginia income tax). Based on a review of online interest rates, properties and sample insurance rates, a mortgage value of \$400,000 was selected at an interest rate of 4.25% and an annual homeowner's insurance cost of \$1,500 for a property estimated at \$500,000 value. Based on the highest-cost system from model runs and parameters described above, the net monthly payment for fire sprinklers is \$1.23, or approximately \$15/year. This is far less than even a minor fluctuation in interest rates that buyers may experience at any time.

Note that permit and plan review fees and time vary from jurisdiction to jurisdiction. Some jurisdictions do not require any plan review for residential fire sprinklers, which is consistent with the "developed pipe length" methodology prescribed in IRC Section P2904. Alternately, some jurisdictions use a flow test of the installed system in lieu of design plans and plan review, which requires a single onsite inspection that can be performed by a regular building or plumbing inspector when performing other on-site inspections.

With respect to maintenance, there is no mandatory maintenance required for typical residential sprinkler systems supplied by a public or private water service, other than not interfering with the system by closing valves, painting sprinklers, etc. Homeowners may choose to perform voluntary verification test for water flow alarms (which are not required by NFPA 13D or IRC P2904).

Specific cost model documentation will be provided separately since cdpVA would not support inclusion of tables in the reason statement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

See reason statement. It is difficult to quantify net cost or savings because these are going to vary based on individual projects and the extent to which developers/builders take advantage of savings incentives to offset costs associated with sprinkler installation.

Resiliency Impact Statement: This proposal will increase Resiliency

See reason statement.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RB313.1(3)-21

This proposal doesn't have any public comments.

RB315.3-21

Proponents: William Penniman (wpenniman@aol.com)

2018 Virginia Residential Code

Revise as follows:

R315.3 Location. Carbon monoxide alarms in *dwelling units* shall be installed outside of each separate sleeping area in the immediate vicinity of the ~~bedrooms, bedrooms and in each room, including the basement, in which combustion occurs.~~ Where a fuel-burning *appliance* is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.

Add new text as follows:

R331 Gas Detectors and Alarms. Fuel gas detectors with alarms appropriate to the fuel combusted shall be installed in each room, including the basement, in which combustion occurs. Such detectors shall comply with UL1484. They shall be installed as recommended by the manufacturers and be made permanent fixtures.

Reason Statement: Indoor combustion of fuels poses serious risks to residents. (See. e.g., Rocky Mountain Institute, et al. "Health Effects from Gas Stove Pollution", <https://rmi.org/insight/gas-stoves-pollution-health/> ; "Gas Stoves Can Generate Unsafe Levels of Indoor Air Pollution," <https://www.vox.com/energy-and-environment/2020/5/7/21247602/gas-stove-cooking-indoor-air-pollution-health-risks> ; Carbon monoxide is one of several pollutants from combustion that endanger residents' health and are potentially deadly. Indoor air pollution can be worse than permissible outdoor pollution levels.

Carbon monoxide is a direct product of combustion and can accumulate in rooms in which the combustion occurs. Gas stoves and unvented combustion devices pose the most obvious dangers. Even vented combustion systems, such as furnaces, pose dangers if they are damaged or if the vents are blocked in whole or in part.

Fuel gas leaks pose health, fire and explosion dangers. Leaks are most likely where appliances are joined to pipes and where gas leaks if the fire is put out or doesn't ignite (e.g., at a gas stove). Leaks can also occur if pipes or equipment are damaged. While an odorizer may help, it may not be adequate if people are sleeping in other rooms or out of the house.

Cost Impact: The code change proposal will increase the cost of construction

The cost impact will be minimal. Combination detectors are available on the market for \$100 or less. If combustion occurs in the utility room and kitchen, the cost could be \$200 or less.

Resiliency Impact Statement: This proposal will increase Resiliency

Avoiding or at least minimizing hazards associated with indoor air pollution and potentially explosive gas leaks will help to protect residents. The risks of leaks from damage to fuel lines will be greater when storms damage buildings.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: RB315.3-21

This proposal doesn't have any public comments.

RB326-21

Proponents: Jason Laws (lawsj@chesterfield.gov)

2018 Virginia Residential Code

Revise as follows:

[RB] ATTIC, HABITABLE. A finished or unfinished area, ~~not considered a story, complying with all of the following requirements:~~ habitable space within an attic

- ~~1. The occupiable floor area is at least 70 square feet (17 m²), in accordance with Section R304,~~
- ~~2. The occupiable floor area has a ceiling height in accordance with Section R305, and~~
- ~~3. The occupiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides and the floor-ceiling assembly below.~~

~~Habitable attics greater than two-thirds of the area of the story below or over 400 square feet (37.16 m²) shall not be permitted in dwellings or townhouses that are three stories above grade plane in height.~~

2021 International Residential Code

SECTION R326 HABITABLE ATTICS

R326.1 General. Habitable attics shall comply with Sections R326.2 and R326.3.

R326.2 Minimum dimensions. A habitable attic shall have a floor area in accordance with Section R304 and a ceiling height in accordance with Section R305.

Revise as follows:

R326.3 Story above grade plane. A habitable attic shall be considered a story above grade plane.

Exceptions: A habitable attic shall not be considered to be a story above grade plane provided that the habitable attic meets all the following:

1. The aggregate area of the habitable attic is

~~either of the following:~~
~~1.1. Not~~
~~not greater than~~

~~one-third~~
~~two-thirds~~ of the floor area of the story

~~below:~~
~~1.2.~~

~~Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904.~~

~~below or a maximum of 400 square feet.~~

2. The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.

~~3.~~

~~The floor of the habitable attic does not extend beyond the exterior walls of the story below.~~

~~4.~~

~~Where a habitable attic is located above a third story, the dwelling unit or townhouse unit shall be equipped with a fire sprinkler system in accordance with Section P2904.~~

R326.4 Means of egress. The means of egress for habitable attics shall comply with the applicable provisions of Section R311.

Reason Statement: To remove the requirements of a habitable attic out of the definition and into the body of the code.

The intent of this change is to use the definition that is currently being used in the 2021 IRC and to adapt the code sections from the 2021 IRC to meet the current Virginia requirements. So this proposal should result in no change to how habitable attics are enforced in Virginia.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
no change in how habitable attics are enforced

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RB326-21

This proposal doesn't have any public comments.

RB330.1-21

Proponents: Jason Laws (lawsj@chesterfield.gov)

2018 Virginia Residential Code

Revise as follows:

R330.1 Sound transmission between dwelling units. Construction assemblies separating *dwelling units* shall provide airborne sound insulation as required in Appendix K.

Exception: *accessory dwelling units*

Reason Statement: Accessory dwelling units are designed to provide an affordable housing alternative. Making ADUs meet the sound transmission requirements can become costly, especially when converting an existing structure, which we feel does not meet the purpose of ADUs.

Cost Impact: The code change proposal will decrease the cost of construction by providing an exception for ADUs it will decrease the cost of construction.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RB330.1-21

This proposal doesn't have any public comments.