PHED/T&E Committees #1, 2, &3
June 25, 2012

Please keep this packet for the June 26 Council session.

MEMORANDUM

June 21, 2012

TO: Transportation and Environment/Planning, Housing, and Economic Development Committees

FROM: Jeff Zyontz, Legislative Attorney

SUBJECT: Proposed Executive Regulations 8-12, 9-12, and 10-12

On June 18, 2012, the County Executive transmitted 3 Regulations:

8-12 2012 International Building, Energy Conservation, Mechanical, Fuel-Gas, and Residential Codes
9-12 Fire Safety Code – Fire Protection Systems
10-12 Fire Safety Code – Building Construction

The Council may approve or disapprove these regulations. It may not amend the regulation. Typically, the Council might ask the Executive to amend the regulation before adoption; amendments are sometimes an alternative to disapproving the regulations originally submitted. Under the County code, the Council has 60 days to act on a method 2 regulation. If it fails to act, the regulation is approved as proposed.[1]

This situation is not typical. These regulations proposed for adoption were transmitted to the Council at noon on June 18, 2012. If the Council does not act by July 1, 2012, the 2012 editions of the International Building Code (IBC), the International Energy Conservation Code (IECC), and the International Residential Code (IRC) would be in effect in the County by operation of state law without any local amendments.[2] Maryland adopted the IBC,

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[1] §2A-15 Method (2)

(A) The issuer must send a copy of the proposed regulation to the County Council after the deadline for comments published in the Register.
(B) The Council by resolution may approve or disapprove the proposed regulation within 60 days after receiving it.
(C) If necessary to assure complete review, the Council by resolution may extend the deadline set under subparagraph (B).
(D) If the Council approves the regulation, the regulation takes effect upon adoption of the resolution approving it or on a later date specified in the regulation.
(E) If the Council does not approve or disapprove the proposed regulation within 60 days after receiving it, or by any later deadline set by resolution, the regulation is automatically approved.
(F) If a regulation is automatically approved under this method, the regulation takes effect the day after the deadline for approval or on a later date specified in the regulation.

[2] COMAR 05-02-07.05 Maryland Building Performance Standards.

A. The IBC, IRC, and IECC, as modified in Regulation .04 of this chapter, shall constitute the Maryland Building Performance Standards.
B. Local Amendments.
(1) Each local jurisdiction:

the IECC, and the IRC. Although Maryland code allows for amendments to those codes under certain circumstances, the amendment must be adopted by July 1, 2012. The last Council meeting before July 1 is June 26.

Regulation 8-12 International Building, Energy Conservation, Mechanical, Fuel-Gas, and Residential Codes

As required by law, the Executive conducted a public hearing on the proposed regulation. The comments received from that hearing are in the attachments. Staff is only aware of 1 point of controversy. As required by state law, the regulations adopt the IECC. The state allows amendments, but only if the amendments do not weaken the standards.[3] The building industry recommended changes to the IECC standards. They wanted to be able to use high efficiency appliances instead of complying with the standards for building envelope tightness and water pipe insulation. (Energy saving credit for using high energy appliances was in the 2009 IECC but was removed in the 2012 IECC.) In the opinion of DPS, the proposed changes would weaken the IECC and therefore DPS did not include the suggested changes in the proposed regulations. *Staff agrees with DPS that alternative standards that weaken a requirement of the IECC should not be part of the adopted regulations.*

DPS believes that amendments to the international codes are in order. In addition to the mandated codes, the proposed regulations include the International Fuel Gas Code (IFGC) and the International Mechanical Code (IMC). The changes proposed by DPS were the subject of a public hearing. DPS, in some cases, revised the Regulation based on the testimony received. *Staff has not had the time in the 3 days between the transmittal of the Executive regulation and preparing this memorandum to make any independent judgment on the utility or wisdom of these changes. Staff did not analyze exactly how DPS responded to the testimony submitted. The Council must consider the opinion of DPS that adopting the changes to the international code are better for the County than adopting the code without any changes.*

Adoption of the International Green Building Construction Code is not included in the proposed regulations. The County's adoption of these codes is permitted by the state. [4] The Green Code is described as follows:

> The International Green Building Construction Code is the first model code that includes sustainability measures for the entire construction project and its site — from design through

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(a) May by local amendment modify the provisions of the Standards to address conditions peculiar to the local jurisdiction's community; and

(b) May not adopt any amendments that weaken the requirements of the IECC or Chapter 13 of the IBC.

(2) If a local jurisdiction adopts a local amendment, the Standards as amended by the local jurisdiction shall apply in that local jurisdiction.

(3) If a local amendment conflicts with the provisions of the Standards, the provisions of the local amendment shall prevail in the local jurisdiction.

(4) Local amendments shall be submitted to the Department:

(a) At least 15 days before the effective date of the amendment; or

(b) In the case of an emergency adoption of a local amendment, within 5 days after the local amendment's adoption.

...

.06 Application of the Standards.

A. Except as provided in §§B and C of this regulation, the Standards shall apply to all buildings and structures within the State for which a building permit application is received by a local jurisdiction.

B. A local jurisdiction shall implement and enforce the Standards and any local amendments within 6 months of the effective date of any amendments by the Department to this chapter.

[3] Op. cit., 05-02-07.05 B(2).

[4] Public Safety Article §12-504(a).

construction, certificate of occupancy and beyond. The new code is expected to make buildings more efficient, reduce waste, and have a positive impact on health, safety and community welfare.

The International Green Code creates a regulatory framework for new and existing buildings, establishing minimum green requirements for buildings and complementing voluntary rating systems which may extend beyond the customizable baseline of the International Green Code. The code acts as an overlay to the existing set of International Codes, including provisions of the International Energy Conservation Code and ICC-700, the National Green Building Standard, and incorporates ASHRAE Standard 189.1 as an alternate path to compliance.

DPS expects to hold hearings on the International Green Building Construction Code and may propose new regulations next year.

Regulation 9-12, Fire Safety Code – Fire Protection Systems

Regulation 10-12, Fire Safety Code – Building Construction

DPS now has responsibility for enforcing fire safety standards for new construction. The current regulations are under the authority of the Department of Fire and Rescue Services (FRS).[5] Part of the reason DPS wants to adopt the new regulation is to reflect the change in responsibility. The current FRS regulations cover both new construction and renovation, yet there is no indication in the proposed regulations that the FRS regulations will be superseded. The 2 Fire Safety code regulations adopt the 2009 provisions of the National Fire Codes, with amendments only for new construction. Currently, the 2003 codes are in effect. It is bad practice to have regulations that contradict each other.

FRS is in the process of revising the provisions of regulations 7-06 and 6-06, for which it still has authority. It is only when new FRS regulations and regulation 9-12 and 10-12 are adopted that the current regulations will be fully superseded. *Staff recommends deferring action on regulations 9-12 and 10-12.*

Unlike regulation 8-12, there is no state imposed deadline to adopt these regulations. There is a reason to wait for the MCFRS regulation before adopting these regulations; it would avoid partially superseding a current regulation and confusing regulation users.

[5] See COMAR 7-06 and 6-06.

OFFICE OF THE COUNTY EXECUTIVE
ROCKVILLE, MARYLAND 20850

Isiah Leggett
County Executive

MEMORANDUM

RECEIVED
MONTGOMERY COUNTY
2012 JUN 15 AM 11:59

TO: Roger Berliner, President
Montgomery County Council

FROM: Isiah Leggett, County Executive

SUBJECT: Executive Regulation 8-12, Adoption of the 2012 International Building, Energy Conservation, Mechanical, Fuel-Gas, and Residential Codes

The purpose of this memorandum is to transmit Executive Regulation 8-12, "Adoption of the 2012 International Building, Energy Conservation, Mechanical, Fuel-Gas, and Residential Codes," for review and consideration by the County Council. Under The Maryland Building Performance Standards contained in COMAR 05.02.07 these building codes became effective in the State of Maryland on January 1, 2012, and pursuant to COMAR section 05.02.07.06.B, the County has six months within which to adopt the new provisions. Accordingly, Executive Regulation 8-12 adopts the 2012 editions of the International Building, Energy Conservation, Mechanical, Fuel-Gas, and Residential Codes. These editions are the most up-to-date versions of the model codes and will keep Montgomery County in conformance with the Maryland Building Performance Standard. This regulation applies to the construction of public and private structures within the County, and would supersede Executive Regulation 14-10.

The regulation was advertised in the April 1, 2012 issue of the Montgomery County Register with a comment deadline of April 30, 2012. The comments that were received are attached. A public hearing was held on April 18, 2012. Two people presented testimony during the hearing. Mr. Bernard Bloom, representing Montgomery County's Environmental Air Quality Action Committee (EAQAC) testified that with the new requirement for tightening the building envelope, the amount of natural air infiltration would need to be increased to aid indoor air quality. The Department also received comments from Mr. Randy Melvin, Maryland National Capital Building Industry Association, Codes and Standards Committee Chair. Among other requests discussed below, Mr. Melvin asked that the department allow trade-offs of building envelope tightness and water pipe insulation against energy-efficient equipment to achieve energy efficiency standards.

Pursuant to COMAR 05.02.07.05.B(1)(b) Montgomery County cannot adopt amendments that "weaken" the requirements of the International Energy Conservation Code (IECC) or Chapter 13 of the International Building Code. The Maryland Building Performance Standards contained in COMAR do not provide guidance as to what constitutes a weakening of the Code provisions. Therefore, changes to address the two sets of comments have not been proposed.

As no adequate data or Codes commentary was provided to support the concern that additional natural air exchanges (which would result in increased energy consumption due to the need to condition the space) meet the energy efficiency requirements, the Department of Permitting Services and the Department of Environmental Protection are working together to analyze the impact resulting from the assertion that there needs to be more frequent natural air exchanges. With respect to industry comments, the Department of Permitting Services is seeking a legal review to determine if allowing trade-offs for energy efficient building systems equipment would be considered a weakening of the IECC. If the review of DPS and DEP of the indoor air quality assertion and the legal review of the authority to permit energy efficiency trade-offs are determined to be allowable, amendments to these regulations are likely to be proposed. In the meantime, the regulations need to be adopted by July 1, 2012 to comply with State law.

Mr. Melvin requested a modification of the makeup air requirement for kitchens that would require only air in excess of the rate of 400 cubic feet per minute to be replaced and a modification to the window sill height requirement. The Department amended the proposed regulation to reflect the reduced window sill height from 24 to 18 inches; however, the Department has not received adequate information to support amending the makeup air requirement. Mr. Melvin also requested to retain Chapter 11, Energy Efficiency, of the International Residential Code (IRC). As the provisions of Chapter 11 and IECC are substantially the same, the Department believes that having only one set of energy efficiency requirements is simple and clear to communicate and administer.

A Fiscal Impact Statement is attached. If there are any questions, please call Hadi Mansouri, Division Chief at 240-777-6233. Thank you for your consideration.

Attachments

OFFICE OF MANAGEMENT AND BUDGET

Isiah Leggett
County Executive

Jennifer A. Hughes
Director

MEMORANDUM

March 29, 2012

TO: Timothy L. Firestine, Chief Administrative Officer

FROM: Jennifer A. Hughes, Director

SUBJECT: Executive Regulation No. 8-12 – Adoption of the 2012 International Building, Energy Conservation, Mechanical, Fuel-Gas, and Residential Codes

Please find attached the fiscal impact statement for the above-referenced executive regulation.

JAH:aw

c: Kathleen Boucher, Assistant Chief Administrative Officer
Lisa Austin, Offices of the County Executive
Joy Nurmi, Special Assistant to the County Executive
Patrick Lacefield, Director, Public Information Office
Diane Schwartz-Jones, Department of Permitting Services
Alicia Thomas, Department of Permitting Services
Phil Waclawski, Department of Permitting Services
Alex Espinosa, Office of Management and Budget
Amy Wilson, Office of Management and Budget
Naeem Mia, Office of Management and Budget

Fiscal Impact Statement
Executive Regulation 8-12 - Adoption of the 2012 International Building, Energy Conservation, Mechanical, Fuel-Gas, and Residential Codes

1. **Executive Regulation Summary**

   Regulation 8-12 adopts the 2012 editions of the International Building Code (IBC), the International Energy Conservation Code (IECC), the International Fuel Gas Code (EFGC), the International Mechanical Code (IMC), and the International Residential Code (IRC) with amendments. It governs all buildings and structures within Montgomery County.

   The Department of Permitting Services (DPS) updates the County Building Code to adopt by reference the most recent model code documents published by the International Code Council. The latest regulation 14-10AM was effective on February 8, 2011.

   Local adoption of the most recent model code documents is also mandated by the Maryland Department of Housing and Community Development (DHCD) through the Maryland Building Performance Standard. Recently, DHCD went through a rulemaking process to adopt the 2012 editions of the International Codes. Accordingly, DPS is proposing conforming changes to County regulations.

2. **An estimate of changes in County revenues and expenditures regardless of whether the revenues or expenditures are assumed in the recommended or approved budget. Includes source of information, assumptions, and methodologies used.**

   There is no change in County revenues or expenditures due to this regulation. The regulation updates the County Building Code to adopt the most recent model code documents published by the International Code Council and will keep the County in conformance with the Maryland Building Performance Standard.

3. **Revenue and expenditure estimates covering at least the next 6 fiscal years.**

   Not Applicable.

4. **An actuarial analysis through the entire amortization period for each regulation that would affect retiree pension or group insurance costs.**

   Not Applicable.

5. **Later actions that may affect future revenue and expenditures if the regulation authorizes future spending.**

   Not Applicable.

6. **An estimate of the staff time needed to implement the regulation.**

   Not Applicable.

(4)

7. **An explanation of how the addition of new staff responsibilities would affect other duties.**

   Not Applicable.

8. **An estimate of costs when an additional appropriation is needed.**

   Not Applicable.

9. **A description of any variable that could affect revenue and cost estimates.**

   Not Applicable.

10. **Ranges of revenue or expenditures that are uncertain or difficult to project.**

    Not Applicable.

11. **If a regulation is likely to have no fiscal impact, why that is the case.**

    There is no fiscal impact to the Department since construction is currently reviewed and inspected for conformance with the model code documents. The changes made in this regulation will not affect the required number of employees for plan review or field inspections nor will not impact the Department's operating costs.

    Additionally, the proposed changes will preclude substantial modifications to the public water system, except in the cases of very tall buildings (greater than 420 feet in height, which should not be an issue in Montgomery County).

12. **Other fiscal impacts or comments.**

    Not Applicable.

13. **The following contributed to and concurred with this analysis.**

    Phil Waclawski, Department of Permitting Services
    Alicia Thomas, Department of Permitting Services
    Amy Wilson, Office of Management and Budget

Jennifer A. Hughes, Director
Office of Management and Budget

3/29/12
Date

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
Originating Department: Department of Permitting Services	Effective Date:

Montgomery County Regulation on:

ADOPTION OF THE 2012 INTERNATIONAL BUILDING, ENERGY CONSERVATION, MECHANICAL, FUEL-GAS, AND RESIDENTIAL CODES

DEPARTMENT OF PERMITTING SERVICES

Issued by:
The County Executive
Regulation No. 8-12
Authority: Code Sections 8-13 and 8-14
Supersedes: Regulation No. 14-10
Council Review: Method 2 under Code Section 2A-15
Register Vol. 29, Issue 4
Comment Deadline: April 30, 2012
Effective Date:
Sunset Date: None

SUMMARY: This regulation adopts the 2012 editions of the International Building Code (IBC), the International Energy Conservation Code (IECC), the International Fuel Gas Code (IFGC), the International Mechanical Code (IMC), and the International Residential Code (IRC) with amendments. It governs all buildings and structures within Montgomery County.

ADDRESS: Department of Permitting Services
255 Rockville Pike, Second Floor
Rockville, Maryland 20850-4166

STAFF CONTACT: Hadi Mansouri, Chief, Division of Building Construction 240/777-6233

BACKGROUND INFORMATION: Inasmuch as the International Code Council (ICC) publishes the international series (I-series) of construction standards every three years, and the State of Maryland adopts these standards and obligates its political subdivisions to adopt the standards within a specific time period. Montgomery County must adopt these standards within the prescribed period.

Sec. 1. This regulation is adopted pursuant to Sections 8-13 and 8-14 of the Montgomery County Code (MCC), 1994, as amended, and applies to the construction, alteration, addition, repair, removal, demolition, use, location, occupancy, and/or maintenance of all buildings and structures, and their service equipment, within Montgomery County. It supersedes Executive Regulations 14-10, dated February 8, 2011, and all previous

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
Originating Department: Department of Permitting Services	Effective Date:

regulations adopting the BOCA and the International Code Council (ICC) standards. Its purpose is to adopt the 2012 editions of the IBC, the IECC, the IFGC, the IMC, and the IRC with amendments necessary to achieve uniformity and consistency with Maryland and Montgomery County laws and ordinances, as well as department/division policies and procedures. Where this regulation differs from the Montgomery County Fire Safety Code it does not preempt or negate any more restrictive provisions of that code.

Sec. 2. Wherever the IBC references the ICC Electrical Code, replace the reference with Chapter 17 of the Montgomery County Code. Wherever the IBC references the ICC/ANSI A117.1, replace the reference with the Maryland Accessibility Code

AMENDMENTS TO THE 2012 INTERNATIONAL BUILDING CODE (IBC)

Sec. 3. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. 4. Section 101.2. Number the existing exception as #1 and add a second exception (#2) to read as follows: Existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations or additions and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code.

Sec. 5. Sections 101.4.3, and 101.4.4[, and 101.4.5]. Delete.

Sec. 6. Section 101.4.1. Delete and replace as follows: The provisions of the International Fuel Gas Code shall apply to the installation of Liquefied Petroleum gas systems and appliances, fuel gas appliances and related accessories as covered in this code. These requirements apply to the inlet connections of appliances and to the installation and operation of residential and commercial gas appliances and related accessories. The provisions of the International Fuel Gas Code apply to the extent that they are adopted in this regulation.

Sec. 7. Section 101.4.5. Add the following at the end of the section. "The provisions of the Montgomery County Fire Safety Code shall also apply."

Sec. [7]8. Section 102.6. Replace the phrase "the International Property Maintenance Code or" with the phrase "the Montgomery County Fire Safety Code and".

Sec. [8]9. Sections 103, [108,] 111, and 113, except 113.2. Delete.

Sec. [9]10. Section 105.1. Add the following: A separate permit is required for each legal address. [and] A separate permit is required for each separate building at a legal address.

Sec. [10]11. Section 105.2. Delete all except subsections 105.2.1, 105.2.2, and 105.2.3.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
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Sec. [11]12. Sections 105.3, 105.4, 105.5, 105.6, and 105.7. Delete.

Sec. [12]13. Section 109.1. Add a second sentence to read: Required fees shall be paid for each separate permit application.

[Sec. 13.] [Sections 109.2 through 109.6. Delete.]

Sec. 14. Section 110.3.10. Add the following: The final inspection must be requested and approved before a building (or portion thereof) including equipments and appliances are used or occupied, whether or not a valid certificate of use and occupancy exists.

Sec. 15. Sections 114 and 115. Delete.

Sec. 16. Section 202. In the definition of Foster Care Facilities, change 2 ½ to 2.

Sec. [16]17. Section 305.2. Change 2½ to 2.

Sec. [17]18. Section 308.[2.]3.1. In the title and text, change the word "five" to "eight". [and the word "six" to "nine."] Delete the phrase "or with Section P2904 of the International Residential Code."

Sec. 19. Section 308.3.2. In the title and text, change the word "six" to "nine".

Sec. 20. Section 308.4.1. Delete the phrase "or with Section P2904 of the International Residential Code."

[Sec. 18.] [Section 308.3.1. Change 2½ to 2 in the definition of Child Care Facilities.]

Sec. [19]21. Section 308.[5.2]6.1. [In code text and exception,] Change 2 ½ to 2.

Sec. [20]22. Section 310.[1]5.1. [After the description for Group R-3 occupancies,] Add the following:

Exceptions:

1. A family day care home, which is a dwelling in which child day care services are provided: a) in the home where the registrant is the provider and a resident, or where the registrant is not a resident, but more than half of the children cared for are residents; b) for not more than eight children, including the children of the provider, who are less than six years of age, and; c) where staffing complies with state and local regulations, but no more than two non-resident staff members are on site at any time, may be classified as Group R-3, or as a one- or two-family dwelling conforming to the IRC; or

2. A group day care home, which is a dwelling in which child day care services are provided: a) in the home where the licensee is the provider and a resident; b) for nine to 12 children, including the children of the provider, and; c) where staffing complies with state and local regulations, but no more than three non-resident staff members are on site at any time, may be classified as Group R-3, or as a one- or two-family dwelling conforming to the IRC.

Delete the phrase "or with Section P2904 of the International Residential Code."

Sec. 23. Section 310.6. In the first sentence [of Group R-4] change "five" to "eight".

Sec. [21]24. Modify Section 403 as follows:

(a) Section 403.2.1.2. Delete.

(b) Section 403.3.2. Add the phrase, "In buildings that are more than 420 feet (128 m) in building height," to the beginning of the section.

Sec. [22]25. Section 403.4.[4]5. Delete the phrase "Section 510 of the International Fire Code" and replace with ["the Montgomery County Fire Safety Code"] "Section 915 of this Code".

[Sec. 23.] [Section 411.1. Number the existing exception as #1 and add a second exception (#2) to read as follows: An amusement which is a multilevel play structure that is not more than 10 feet in height and has an aggregate horizontal projection not exceeding 160 square feet.]

[Sec. 24.] [Section 419. Delete.]

Sec. [25]26. Section 422.[3].4. Change "30" to "15". Change "2.8" to "1.4" and change "nonambulatory patient" to "occupant".

Sec. [26]27. Chapter 4. Add a new section 42[4]5 Residential Occupancies.

42[4]5.1 All R occupancies shall have appropriate radon control features prescribed in Appendix F in the International Residential Code, [2009] 2012 edition.

Sec. [27]28. Section 501.2. Delete "and existing" in the first line. In the second sentence, Change the phrase "4 inches (102 mm)" to "6 inches (153 mm), except R-3 occupancies which shall be permitted to be 5 inches (127 mm),".

Sec. [28]29. Section 5[09]10.2. Add two more conditions as follows:

8. For purposes of determining the number of stories above grade, a story above the 3-hour horizontal assembly shall be considered a story above grade regardless of the location of the average grade plane.

9. A fire command center complying with Section 911 shall be provided.

Sec. [29]30. Section 703.[6]7. Amend item 3 to add a sentence as follows: "The sign or stenciling shall identify the fire resistance rating in hours."

Sec. [30]31. Section 7[08]13.14.1. Add the following sentence at the end of the section: Where an enclosed elevator lobby is provided, exit access corridors shall not be interrupted by an elevator lobby.

Sec. [31]32. Section 7[16]17.5.3. Replace the first sentence of Exception 2 with the following: "In buildings, other than Group H occupancies, equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, smoke dampers are not required where:"

Sec. [32]33. Section 903.1.1. Delete and replace with the following: 903.1.1 Alternative Protection. Where automatic sprinkler systems are required by this code; and, where water as an extinguishing agent is not compatible with the fire hazard, or is prohibited by a law, statute, or ordinance, the affected area [must] shall be protected by an approved automatic fire-extinguishing system utilizing an extinguishing agent that is compatible with the fire hazard.

Sec. [33]34. Section 903.2.1.2. Add a fourth condition to read as follows:

4. The assembly occupancy is one of the following (1) Bars with live entertainment, (2) Dance halls, (3) Discotheques, (4) Nightclubs, or (5) Assembly occupancies with festival seating as defined in the Life Safety Code, 2009 edition.

Sec. [34]35. Section 903.2.8. Add an exception to read as follows:

An automatic sprinkler system throughout the building is not required when all of the following conditions are met:

1. The building is a mixed use building, that is not otherwise required to be protected throughout by automatic sprinklers;
2. There is only one dwelling unit in the building;
3. The dwelling unit is separated from the remainder of the building by fire barriers in accordance with Section 707 and horizontal assemblies in accordance with Section [712] 711 having a fire resistance rating not less than 2 hours;
4. The means of egress from the dwelling unit is independent from the other occupancies; and,

5. The dwelling unit is protected throughout with automatic sprinklers. The automatic sprinkler system installed for this exception shall be permitted to be designed in accordance with Section 903.3.1.3.

Sec. 36. Section 903.2.8.2. Change "five" to "eight"

[Sec. 35.] [Section 903.3.1.3. Add the following sentences at the end of the section: Automatic sprinkler systems in day care homes with 12 clients or less located in converted one and two family dwellings or townhouses shall be permitted to be installed in accordance with NFPA 13D. Unless specifically permitted by this Code, automatic sprinkler systems in occupancies, other than one and two family dwellings or townhouses, shall be installed in accordance with Section 903.3.1.1 or 903.3.1.2.]

Sec. [36]37. Section 905.3. After the section title add the following two sentences: In new installations where the code requires either Class II or III standpipes, Class I standpipes shall be installed. Occupant use hose is prohibited in new or existing buildings.

Sec. 38. Section 908.7. Add the following sentence after the sentence ending in "manufacturer's instructions": "At a minimum, a carbon monoxide alarm shall be installed outside each sleeping area."

Sec. [37]39. Section 909.9. Add the following sentence at the end of the section: In all cases, the design fire size shall not be less than 5000 Btu/s (5275 kW) unless approved by the building official and the fire official.

Sec. [38]40. Section 909.16. In the third sentence, replace the words "approved location adjacent to the fire alarm control panel" with "location approved by the building official and the fire official".

Sec. [39]41. Section 911.1.1. Replace with the following, "The fire command center shall have a door directly to the exterior of the building on the address side. The exterior door to the fire command center shall be within 50 feet of a fire department access road. A fire department access box shall be provided within 6 feet of the exterior door to the fire command center. The exterior door to the fire command center shall be identified on the exterior face as the fire command center in a manner acceptable to the fire official."

Sec. [40]42. Section 911.1.5.

Amend item 2 to read "The fire department communications system which may include an in-building public safety radio enhancement system monitoring panel."

Amend item 11 to read "Fire pump status indicators and remote starting."

Add an item [18] 19 which reads, "A shunt trip device to disconnect the electrical service to the building."

Sec. [41]43. Section 915.1. Replace with the following: Emergency responder radio coverage shall be assured in all newly constructed below ground floors of a building, all floors in buildings greater than 25000 ft² per floor, and to all floors of buildings greater than 3 stories in height. One- and two-family dwellings and townhouses are exempt from this requirement.

Sec. [42]44. Add Sections 915.2 and 915.3 as follows:

Section 915.2. Every floor area in a building or structure which can not achieve the required level of emergency responder radio coverage as established by Montgomery County Department of Technology Services shall be provided with an in-building public safety radio enhancement system in accordance with the Montgomery County Fire Safety Code.

Section 915.3. Inspection and Testing. Emergency responder radio coverage and in-building public safety radio enhancement system must be tested, and inspected by approved individuals. The results of the testing and inspection shall be certified to the code official prior to issuance of an occupancy permit.

Sec. 45. Section 1001.1. Add the following to the end of the section: "The means of egress shall also comply with the requirements in the Life Safety Code, 2009 edition."

Sec. [44]46. Section 1003.5. In exception #2, replace the phrase "a single riser or with two risers and a tread" to "three risers or less". Add the following at the end of exception #2: "The presence and location of each step shall be marked in accordance with NFPA 101, Section 7.2.2.5.4.3."

Sec. [43]47. Table 1004.1.[1]2. Add an entry for "Shell Office Spaces" with an occupant load factor of 65 gross square feet per person. Add an entry for "Tennis Courts (within the area of play)" with an occupant load factor of 50 net square feet per person.

Sec. [45]48. [Reserved.] Section 1005.3.1. Delete the exception.

Sec. [46]49. [Reserved.] Section 1005.3.2. Delete the exception.

Sec. [47]50. Section 1008.1.2. Add a sentence at the end to read: "Doors in exit enclosures shall swing in the direction of egress travel unless the door opening serves an individual living unit that opens directly into an exit enclosure."

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
Originating Department: Department of Permitting Services	Effective Date:

Sec. [48]51. Section 1008.1.9.[10]11. In Exception #3, delete all text after the phrase "...openable from the egress side".

Sec. [49]52. Section 1009.[13]16. At end of the section add the phrase "or ladder complying with Section 7.2.9 of the Life Safety Code, 2009 edition".

Sec. [50]53. Section 1012.6. At the end of the last sentence add the phrase "unless, in the opinion of the AHJ, an extension in the same direction of the stair or ramp creates a hazard in the means of egress."

Sec. [51]54. Section 1012.7. Change "1 ½" to "2 ¼" and change "38" to "57".

Sec. [52]55. Section 1013.[1]2. After the phrase "equipment platforms," add the phrase "retaining walls,".

Sec. [53]56. Section 1013.[2]3. In exception [#1 and] #2 and #3, change "34 inches (864 mm)" to "36 inches (915 mm)". Add a [fifth] sixth exception: Exception [5]6. In occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, interior guards shall be permitted to be not less than 36 inches high.

Sec. [54]57. Section 1013.[3]4. Delete Exception #6.

Sec. [60]58. Section [1405.13.2] 1013.8. [Number the existing exception as #1 and] Add two exceptions (#[2]5 and #[3]6) to read as follows:
Exception #[2]5: In buildings four stories or less, the lowest part of the clear opening of the window shall be permitted to be at a height not less than 18 inches (457mm) above the finished floor surface of the room in which the window is located.
Exception #[3]6: In buildings four stories or less, glazing between the floor and a height of 18 inches (457mm) shall be fixed or have openings through which a 4-inch (102mm) sphere cannot pass.

Sec. 59. Section 1014.3. Add the following to the end of the section: "See also the requirements in the Life Safety Code, 2009 edition."

[Sec. 55. Section 1015.2.1. Add the following exception: Exception 3. In buildings of Group R-2 four stories or less in height above the grade plane that are served by two required exterior stairways connected by an open-ended corridors in compliance with Section 1026.6, Exception 4 shall be provided with remoteness between the near edge of the required landings that are separated by a distance of at least one fourth the length of the maximum overall diagonal dimension of the area served.]

Sec. 60. Section 1015.6. Change 2 ½ to 2.

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Sec. [56]61. Section 1018.1. Replace Exception 4 with the following: A fire resistance rating is not required for corridors within single-tenant Group B occupancies.

Sec. [57]62. Section 1020. Add a new section 1020.3 to read as follows:

Section 1020.3. Fire Department Access to Floors. Not less than one exit stair which serves all stories of the building shall be accessible by an internal corridor from the main entrance of the building or the fire department response location.

Sec. [58]63. Section 1027.1, Exception 1, Item 1.1. Add two sentences at the end of the item that read as follows:

The door to the exterior of the building shall be in direct sight of the point of the termination of the exit. For the purposes of this section, the use of exit signs or other exit markings shall not be considered as making the way to the exterior "readily visible and identifiable".

Sec. [59]64. Chapter 11. Delete and replace with the Maryland Accessibility Code.

Sec. 65. Section 1603.1.4 Add to Item 1. The ultimate design wind speeds in miles per hour in Montgomery County for risk categories I, II, III, and IV are 105, 115, 120, and 120, respectively. The corresponding nominal design wind speeds in miles per hour are 82, 89, 93, and 93, respectively.

Sec. 66. Section 1603.1.5. Add to Item 3. The mapped spectral response acceleration parameters for Montgomery County for short-period, S_s, and 1-second, S_1, shall be 12.5% and 5.5%, respectively.

Sec. [61]67. Table 1607.1 Item [29] 26 Roofs. Modify the uniform live load value for "Ordinary flat, pitched and curved roofs (that are not occupiable)" to 30 pounds per square foot, nonreducible.

Sec. [62]68. [Add a new section as follows:]

Section 1607.[14]7.2. Modify Item 1 to read as follows: [Fire Truck Loading. Structural members subject to fire truck loading shall be designed for the concentrated loads applied by the vehicle to the structure as described below:]

The maximum fire truck operating weight is 85,000 pounds distributed in three axles spaced 19 feet 6 inches and 4 feet 6 inches apart. The transverse wheel distance is 8 feet 2 inches. The front axle weighs 23,000 pounds and rear axles weigh 31,000 pounds each. When the ladder is up, the vehicle is raised and supported on four (4) outriggers spaced 10 feet apart along the length of the vehicle and 16 feet apart in the transverse

direction. Depending upon the position of the ladder, any pair of two front, side or rear outriggers apply to the structure a force of 123,552 pounds (61,776 pounds per outrigger in accordance with NFPA 1901, Chapter 20.21.4.2) and the remaining two outriggers apply a force of zero (0) pounds. Outrigger pad dimensions are 2 feet 2 inches wide by 2 feet 6 inches long.

Sec. [63]69. Section 1608.2. After the title add the following sentence: "Design ground snow loads for Montgomery County shall be not less than 30 pounds per square foot."

Sec. [64]70. Section 1612.3. After the heading, delete the text and replace with the following: The flood hazard map of Montgomery County is established in Section 3 of Executive Regulation 24-06 AM, Floodplain Regulations, per the authority in Article III, Chapter 19 of the Montgomery County Code.

Sec. 71. Section 1705.2.1. Modify AISC 360 Chapter N, Section N1, First User Note: Delete the sentence starting with "Additionally, where...".

Sec. 72. Section 1705.2.1. Modify AISC 360 Chapter N, Section N5.5b: After "minimum design loads for buildings and other structures" add "or IBC Table 1604.5".

Sec. 73. Section 1705.2.1. Modify AISC 360 Chapter N, Section N5.5b: Add at the end of the paragraph "unless a higher percentage is required by the structural engineer of record".

Sec. 74. Section 1705.2.1. Modify AISC 360 Chapter N, Section N5.5b, User Note: Add at the end of the user note "unless otherwise specified by the structural engineer of record".

Sec. 75. Section 1705.2.1. Modify AISC 360 Chapter N by deleting Section N7 and replace with IBC Section 1704.2.5.

Sec. [65]76. Section [1704.4] 1705.3. Delete Exception 1.

Sec. [66]77. Section [1704.4] 1705.3. Delete Exception 2.3. Amend exception 2.1 by adding the word "or" after the semicolon. Amend exception 2.2 by deleting the word "or".

Sec. [67]78. Table [1704.4] 1705.3 Items 10 and 11. Modify the inspection frequency from "periodic" to "continuous".

Sec. [68]79. Table [1704.4] 1705.3 Item 11. Add the sentence to the first column, "The strength evaluation shall be demonstrated by field cured cylinders only."

Sec. 80. Table 1705.6 Item 1. Modify the inspection frequency from "periodic" to "continuous".

Sec. [69]81. Add a new section as follows: Section 1801.3 Special conditions. Design and

construction of all buildings and structures within 1000 feet of a known municipal solid waste (MSW) landfill site that does not currently have an operational land fill gas (LFG) monitoring and removal system, shall require special engineering of foundation systems, including walls and floor slabs, to provide for the safety of occupants against hazards from LFG concentration. Special subsurface investigations shall be conducted, at the owner's expense, by an approved and qualified engineer or geologist to determine the extent of the potential hazard. The study must identify the potential hazards, and mitigation plans for the site must be incorporated into the construction documents and approved prior to issuance of a building permit. All buildings and structures within 1000 feet of the boundary of a MSW landfill shall be equipped with a methane gas detector with an alarm activation level of 20% of the lower explosive limit (LEL 1% by volume).

Sec. [70]82. Section 1809.5. In item number 1, after the word "locality" insert: "Depth shall be a minimum of [24] 30 inches below the adjacent finish grade."

Sec. [71]83. Add a new section as follows:

1901.2.1. For precast structures, in the case of a conflict between ACI 318 and PCI Design Handbook, the requirements of ACI 318 shall control the design.

Sec. [72]84. Chapter 29. Delete. Plumbing regulations are administered by the local water authority.

Sec. [73]85. Sections 3001.2, 3001.3, and 3001.4. Delete and replace with the following: 3001.2 Standards. The Maryland Department of Labor, Licensing, and Regulation, Division of Labor and Industry, regulates the design, installation, inspection, and testing of all hoisting and conveying equipment.

Sec. [74]86. Section 3107.1. Add the following at the end of the sentence: "and Chapter 59 of the Montgomery County Code, 1994, as amended."

Sec. [75]87. Section 3109.3. Change "4 feet (1290 mm)" to "5 feet (1524 mm)".

Sec. [76]88. Section 3109.4.1. Change "48 inches (1219 mm)" to "60 inches (1524 mm)".

Sec. [77]89. Section 3302. Add a new section 3302.3 which reads "Construction safeguards shall also comply with NFPA 241, Standard for Safeguarding Construction, Alteration and Demolition Operations, 2004 edition."

Sec. [78]90. Section 3401.1. Add the following at the end of the sentence: Existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations or additions and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code. Buildings undergoing repair, alterations, additions and change of occupancy shall also comply with the Montgomery County Fire Safety Code.

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Sec. [79]91. Appendix F. Appendix F is hereby adopted in its entirety.

Sec. [80]92. Appendix G. Appendix G is hereby adopted in its entirety and amended as follows:

Section G102.1. Insert after International Building Code the phrase "and the provisions of Article III, Chapter 19 of the Montgomery County Code, and Executive Regulation 24-06 AM."

Section G102.2. Replace the parentheses and the phrase within the parentheses with the effective date of this regulation.

Sec. [81]93. Appendix H. Appendix H is hereby adopted in its entirety and amended as follows:

Section H 101.1. Insert at the beginning of this section "The provisions of this chapter shall apply to signs that are permitted by the Montgomery County Zoning Ordinance".

Section H 101.2. Delete.

Section H102.1. Delete definitions for "Combination sign", "Display Sign", "Pole Sign", "Portable Display Surface", and "Projecting Sign."

Section H102.1. Add definition of "Supported Sign" as follows: 'A sign that is attached to a structure like a pole, column, frame, or brace, as its sole means of support, and is not a ground sign and is not attached to a building.

Section H102.1. Delete and replace the definition of "sign" as follows: "Any device, fixture, placard, or structure that uses any color, form, graphics, illumination, symbol, or writing to attract attention or to communicate information".

Section H102.1. Delete and replace the definition of "ground sign" as follows: "A sign erected on the ground or with its bottom edge within 12 inches of the ground, that has its support structure as an integral part of the sign, and where the dimensions closest to the ground is greater than height.

Section H102.1. Delete and replace the definition of "wall sign" as follows: "Any sign that is attached to the wall of a building. There are two types of wall signs: Flat wall sign: A sign that is parallel to the wall of a building to which it is attached, but does not extend more than 12 inches from the building face; Projecting wall sign: A sign that is attached to a wall of a building and extends more than 12 inches from the building face.

Section H104. Delete.

Section H108. Delete.

Section H109. Add the words "and supported" between "ground" and "sign" in the title and in the first two sentences of H109.1

Section H109.2. Delete.

Section H110. Delete the text of H110.1 (including the exception) and replace with the following "Roof signs are prohibited." Delete Sections H110.2 through H110.5.

Section H111.3. Add the word "wall" between "projecting" and "sign".

Section H112. Add the word "wall" between "projecting" and "sign" in the title and first sentence.

Section H112.4. In the first sentence, delete all text starting with the word "except".

Section H113. Delete.

Section H114. Delete the word "roof" in the first sentence.

AMENDMENTS TO THE [2009]2012 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)

Sec. [82] 94. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

[Sec. 83. Section 101.2. Add exception to read as follows: Energy conservation systems and components in existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alteration or additions, and change of occupancy, shall be permitted to comply with the Maryland Building Rehabilitation Code.]

[Sec. 83.1 Add Section 404.4.2.3. Notwithstanding the provisions of section 402.4.2 ten (10%) of all new one- and two-family dwellings constructed between July 1, 2010 and June 30, 2011 must be tested in accordance with section 402.4.2.1 and all test results must be reported to the Department.]

AMENDMENTS TO THE [2009] 2012 INTERNATIONAL MECHANICAL CODE (IMC)

Sec.[84.]95. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. [85.]96. Section 101.2. Add exception to read as follows: Mechanical systems in existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations, or additions, and change of occupancy shall be permitted to comply with the International Existing Building Code.

Sec. [86.]97. Sections 106.4.3, 106.4.4, 106.5, and 109. Delete.

Sec. [87.] 98. Add new section 302.6 Supports and Anchorage. All appliances located on roofs shall rest on a manufacturer's standard perimeter support, self flashing roof curb, framed steel support, or 4 X 4 treated lumber as a minimum. The appliances shall be securely affixed in an approved [manor]manner to resist vibration and wind loads.

Sec. [88.]99. Add new section 306.1.1.1 Heating Appliances. Electric, fossil or solid fuel fired appliances shall not be installed under any stairway or landing.

Sec. [89.]100. Section 306.3. After the last sentence add the following: Access to the attic opening shall be provided by a permanent or pull-down stairway in all new construction. In existing installations, portable ladders shall be acceptable.

[Sec. 90. Table 403.3 under heading "Specialty Shops"
Add Automotive service or repair garages- note b.]

Sec. [91.]101. Section 506.1 Add the words "and NFPA 96." to the end of the first sentence and the sentence "Where discrepancies occur the most astringent will apply." after the first sentence.

Sec. [92.]102. Section 506.3.2.5 Change "100" to "300".

Sec. [93.]103 Section 506.3.9 [Add the words "vertical and" in the heading after the word duct. In the first sentence change 20 feet to "12 feet" and after the first sentence add "Vertical cleanouts shall be provided on each floor". (NFPA96)] Change the heading to "Grease Duct Vertical and Horizontal Cleanouts". Subsection 1. Change "20 feet" to "12 feet". Add subsection 7. to read; "Vertical rises where personal entry is not possible, adequate access for cleaning shall be provided on each floor level.

Sec. [94.]104. Section 506.3.12.2 After the last sentence add "Follow NFPA 96 section 7.8.3 for additional termination requirements."

Sec. [95.]105. Section 606.2.1 Under the heading exception, add the words "Return air" to the beginning of the first sentence. After the last sentence add "Supply smoke detectors shall not be required for fan units whose sole purpose is to remove air from the inside of the building to the outside of the building. [(NFPA90A)] (NFPA 90A)

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Sec. [96.]106. Section 606.2.1 Add to the words "Supply and" to the beginning of the heading. Add the words "supply and" after the word "in" in the first sentence and add "in the supply air duct or plenum downstream of the air filters and ahead of any branch connections," after (0.9 m3/s) in the first sentence.

Sec. [97.]107. Section 607.5.5 exception 2 Replace the first sentence of Exception 2 with the following: "In buildings, other than Group H occupancies, equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, smoke dampers are not required where:"

Sec. [98.]108. Add new section 608 Emergency and Standby Power Systems

Sec. [99.]109. Add new section [F] 608.1 Installation. Emergency and standby power systems required by the International Fire Code or the International Building Code shall be installed in accordance with NFPA 110 , NFPA 111 and the International Fire Code. Existing installations shall be maintained in accordance with the original approval.

Sec. [100]110 Add new section [F] 608.1.1 Stationary Generators. Stationary emergency and standby power generators required by the International Building Code and the International Fire Code shall be listed in accordance with UL 2200.

Sec. [101]111. Add new section [F] 608.2 Standby Power. Where the standby system is a generator set inside a building, the system shall be located in a separate room enclosed with a 2-hour fire barrier constructed in accordance with section 707 or horizontal assemblies constructed in accordance with section 712 of the International Building Code, or both. System supervision with manual start and transfer features shall be provided at the fire command center.

Sec. [102.]112. Add new section 608.2.1 Ventilation Air. Ventilation air shall be supplied directly from a source outside the building by an exterior wall opening or from a source outside the building by a 2-hour fire rated air transfer system. (NFPA 110)

Sec. [103.]113. Add new section 608.2.2 Discharge air. Discharge air shall be directed outside the building by an exterior wall opening or to an exterior opening by a 2-hour rated air transfer system. (NFPA 110)

Sec. [104.]114. Add new section 608.2.3 Fire Dampers. Fire dampers, shutters or other self closing devices shall not be permitted in ventilation or discharge air openings or ductwork for standby power systems. (NFPA 110)

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Sec. [105.]115. Add new section 608.2.4 Motor Operated Damper. Motor operated dampers, when used, shall be spring operated to open and motor closed. (NFPA 110)

AMENDMENTS TO THE [2009]2012 INTERNATIONAL FUEL GAS CODE (IFGC)

Sec. [106.]116. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. [107.]117. Section 102.2.1. Delete and replace to read as follows: As an alternative to the provisions of this code, fuel-gas piping systems, fuel-gas utilization equipment and related accessories in existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations, or additions, and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code.

Sec. [108.]118. Sections 106.5.3, 106.5.4, 106.6, and 109.2 to 109.7 Delete.

Sec. [109.]119. Chapter 4. Delete all except Sections 401.2, 402.6.1, 412, 413, and 414.

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AMENDMENTS TO THE [2009] 2012 INTERNATIONAL RESIDENTIAL CODE (IRC)

Sec. [110]120. Section R101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. [111]121. Section R101.2. Add New Exception to read as follows: Existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations or additions and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code. Delete Exceptions 1 and 2.

Sec. [112]122. Section 102.7. Delete the phrase "the International Property Maintenance Code."

Sec. [113]123. Section R105.2, Items 1 & 2. Delete. Item 3. Change 4 to 4 ½ and 1219 to 1372. Delete Sections R105.3.1.1, R105.3.2, and R105.5. [Delete]. Item 7: Delete "swimming" and change 24 (610 mm) to 18 inches (457 mm). Item 8: Add "playhouses, treehouses or similar structures" after first word. Delete Item 10, [delete]. Add Item 11: Replacing windows and doors without changing the size of openings and without reducing the net clear opening dimensions. Add Item 12: Replacing roofing or siding materials with in kind materials.

Sec. [114]124. Section 107. Delete.

Sec. [115]125. Section R108.1. Replace the second sentence with the following: Required fees shall be paid for each separate permit application. Sections 108.2 through 108.5. Delete.

Sec. [116]126. Sections R109.1 through R109.1.6. Delete all except R109.1.2, R109.1.5, and R109.1.5.1 and replace with the following: R109.1 Types of inspections. The following inspections must be conducted for all buildings and structures:

1. Sign: The sign must be posted on the property within 3 days after the permit issuance date and must remain posted on the property for 30 days. The sign must be located on the side of the lot/parcel, which provides principal access to the street or right-of-the-way. It must be conspicuously posted not more than 5 feet from the front property line and mounted at least 30 inches, but not more than 60 inches, above the ground. NO BUILDING INSPECTION WILL BE PERFORMED PRIOR TO THE APPROVAL OF THIS INSPECTION.

2. Footings: Conducted prior to concrete placement and after excavations for all footings and thickened slabs are completed; after form work, reinforcing steel, concrete-encased electrode (for new dwellings), and grade stakes are in place; and

after sediment control measures are installed according to the approved sediment control plan.

3. [Foundation/parging or back-fill] Waterproofing/Foundation Drainage: Conducted after the exterior walls have been waterproofed and the exterior drain tiles have been installed. Insulation, if used, shall be in place and protected as required. If interior drain tiles are to be used, weep holes (2 in. minimum diameter, 6 feet on center) must be installed. A second inspection may be required prior to backfilling the interior drainage system.

4. Concrete slab-on-ground floor: [Conducted after the installation of the gravel base, vapor barrier, slab edge insulation, and required radon-control features prescribed in Appendix F. When a sump crock is used for radon venting, it must be in place at the time of inspection.] Concrete slab-on-ground floor: After the installation of the slab base, vapor retarder, slab edge insulation, and a minimum 3 in. schedule 40 PVC, or equivalent gas tight pipe inserted into a 3 in. tee embedded into the slab base for the venting of RADON GAS and labeled adequately. Where the sump crock is to be used for the venting of RADON GAS, it must be in place at the time of the inspection. Additions to an existing building that has the final inspection older than a year does not require a radon control system.

5. Wall check (house location survey): The owner must have a house location survey prepared and certified by a Maryland Registered Land Surveyor and must submit a copy to the building official for approval prior to erecting the framing. A wall check not identified by a premise address and permit number will not be accepted. A FRAMING INSPECTION WILL NOT BE CONDUCTED WITHOUT AN APPROVED WALL CHECK.

6. Masonry fireplace/flue: Conducted after the fireplace and first flue liner section are completed.

7. [Factory-built fireplace/flue: Conducted at the framing inspection after installation of the unit.] Wall Bracing: Conducted prior to installation of weather-resistive barrier (house wrap).

8. Framing ("close-in"): Conducted after the completion of all framing, air sealing, rough wiring [electrical/mechanical construction,] fire sprinkler system installation and testing, plumbing, [and] gas, and mechanical distribution systems (as required) [piping and just] but prior to [concealment with insulation or interior finishing materials] installing exterior finish, insulation and drywall. Roof is to be completed and weatherproof. The exterior finish is not to be installed until framing (close-in) has been approved. [The] When plumbing/gas work is part of the construction, [inspection approval must have been granted by the] a Washington Suburban

Sanitary Commission (WSSC) plumbing inspection must be approved [prior to the] before requesting [for] a framing inspection. [The rough wiring and mechanical inspections must be requested at the same time.] The building, electrical and mechanical inspections must be requested at the same time. WHEN [THE] FLOOR FRAMING IS LESS THAN 36 INCHES (914 MM) ABOVE THE SURFACE BELOW, A FRAMING INSPECTION SHALL BE REQUESTED PRIOR TO INSTALLATION OF ANY FLOOR [DECKING] MATERIALS.

9. Insulation [Inspection]: Conducted after the FRAMING (close-in) has been approved [completion of both floor and wall framing] to verify that the installed insulation R-value matches the approved plans or specifications for the building.

10. Swimming Pool Bonding – Conducted when the pool has been formed with the rebar installed and bonded prior to placement of concrete or backfill. During construction pool excavations must be completely enclosed by a 42 in. high safety fence AT ALL TIMES when work is not being performed in the pool.

[10] 11. Well and Septic Systems: Where a building is served by an on-site water system or an on-site sewage disposal system, prior to the final inspection, an "Interim Certificate of Portability" or "Certificate of Portability" and/or a "Certificate of Sewage Disposal", as appropriate, must be issued by the Department. Where a building is served by an on-site water system or an on-site sewage disposal system, any condition of the permits issued for those systems shall be satisfied prior to the final inspection.

[11] 12. Final and U/O: Conducted after the building is completed and ready for occupancy, but prior to settlement on the house, unless the contract owner waives the requirement for final inspection and provides the building official with a written copy of the waiver. For new construction, final electrical, mechanical, and sprinkler inspections must be requested with the final building inspection, and the address numbers must be displayed in accordance with the requirements of the fire code. Note: A final approval from WSSC shall be obtained for all plumbing/gas installations prior to requesting final building inspections from the County. [Also, The Sprinkler] The final approval for sprinkler final inspection, duct blaster and blower door tests certifications, if required, shall be obtained [approval must have been granted by the Department of Fire & Rescue Services (DFRS)] prior to the request for a final inspection. If an owner refuses access within a reasonable time after a house is completed, the building official may close the permit file, but this action will not relieve the owner from any obligation to comply with applicable codes. The final inspection must be requested and approved before a building (or portion thereof) is used or occupied.

13. Partial Inspection: Conducted upon request. A fee must be paid, at the DPS office,

when scheduling this inspection.

[12] 14. Re-inspection: Any of the above inspections disapproved twice for the same violation will be subject to a re-inspection fee, as established in the Schedule of [Permit and License] Fees for Permits, Licenses, and Certifications, which must be paid before any further inspections will be performed at the building site.

Sec. [117]127. Sections R110.2 Delete.

Sec. 128. Sections R110.3 Item 3. Delete the words "name" and "owner" and add "building or structure". Delete Item 6. Delete Item 8.

Sec. 129. Sections R110.4 Delete.

Sec. [118]130. Sections R112. Delete except R112.2.

Sec. [119]131. Section R202. To the definition dwelling unit add: A dwelling unit may contain a family day care home, group day care home, a home occupancy or home health care practitioner complying with Chapter 59, Montgomery County Code. Note: A certificate of use and occupancy is required before any space dedicated for home occupancy or home health care practitioner can be used or occupied. See Chapters 8 and 59, Montgomery County Code.

[Delete in the first paragraph of definition of Attic, Habitable, "or unfinished" and "not"]

Delete words "for living" from the definition of "Guestrooms"

Delete definition of "Lodging House"

Add definition for Storage, finished: A finished area having no more than two (2) 120V outlets and no other wiring methods (CATV, satellite, data communication, etc.), excluding lighting requirements.

Sec. [120]132. Table R301.2(1). Under the headings indicated insert the appropriate criteria, as follows: GROUND SNOW LOAD--30 pounds per square foot (psf); WIND-Speed--90 miles per hour (mph); TOPOGRAPHIC EFFECTS---No; SEISMIC DESIGN CATEGORY—B; SUBJECT TO DAMAGE FROM-Weathering—severe, Frost line depth—24 inches (612 mm), Termite—moderate to heavy, and Decay—slight to moderate; WINTER DESIGN TEMP—13 degrees Fahrenheit (F); ICE SHIELD UNDERLAYMENT REQUIRED—yes; footnote h; FLOOD HAZARDS—yes; footnote g: (a), (b) July 2, 1979; AIR FREEZING INDEX—300; MEAN ANNUAL TEMPERATURE—55.

Sec. [121]133. Section R305.1, Exception 1. Delete the first occurrence of the word "required." Delete the phrase "with no portion of the required floor [area] may have a ceiling height of less than 5 feet (1524 mm)" and replace it with the phrase "Any floor area having less than 5 (1524 mm)" feet of ceiling height shall not be considered part of the room area and shall not be allowed to have any permanent fixtures or furnishings such as, but not limited to, cabinets, counters, and shelves." Sections R305.1.1 Delete.

Sec. [122]134. Sections R307.1. Delete "and in accordance with the requirements of Section P2701.5"

Sec. 135. Delete Section R309.5

Sec. 136. Delete Exception in R310.2.2.

Sec. [123]137. Section R312.1. After the first occurrence of the phrase "floor or grade below" insert the phrase "and retaining walls with a difference in grade level on either side of the wall exceeding 30 inches (762 mm) and within 2 feet (610 mm) of a defined walkway, path, parking lot, or driveway on the high side."

Sec. [124]138. Section R313.1.1. Replace Section P2904 with NFPA 13D.

[Sec. 125. Section R313.2. Delete "effective January 1, 2011".]

Sec. [126]139. Section R313.2.1. Delete "Section P2904 or".

Sec. [127]140. Add new subsection R313.3. Rehabilitation work in one- and two- family dwellings and townhouses equipped with an approved sprinkler system. An approved automatic fire sprinkler system shall be maintained in areas undergoing rehabilitation work.

Add new subsection R313.4. Automatic sprinkler system for reconstruction. An approved automatic fire sprinkler system shall be installed when 50 percent or more of the gross floor area as defined in section 1002.1 of the IBC of the existing building is demolished.

Sec. 141 Section R314.3.1. Exception 2. Add "and electrical" after the word "plumbing"

Sec. [128]142. Section R319.1 Change "4 inches (102 mm)" to "5 inches (122.5 mm).

Sec. [129]143. Section 321.1 Add a new sentence. Walls and ceiling of elevator shafts shall be covered with by not less than 5/8-inch (15.9 mm) Type X gypsum board.

Sec. [130]144. Section 321.3. Delete.

Sec. [131]145. Section R322.1. To the first paragraph add the phrase "and the Floodplain District

Requirements, Article III, Chapter 19, of the Montgomery County Code, and Executive Regulation 24-06 AM."

Sec. [132]146. Add a new section as follows: Section R401.5. Special conditions. Design and construction of all buildings and structures within 1000 feet of a known municipal solid waste (MSW) landfill site that does not currently have an operational land fill gas (LFG) monitoring and removal system, shall require special engineering of foundation systems, including walls and floor slabs, to provide for the safety of occupants against hazards from LFG concentration. Special subsurface investigations shall be conducted, at the owner's expense, by an approved and qualified engineer or geologist to determine the extent of the potential hazard. The study must identify the potential hazards, and mitigation plans for the site must be incorporated into the construction documents and approved prior to issuance of a building permit. All buildings and structures within 1000 feet of the boundary of a MSW landfill shall be equipped with a methane gas detector with an alarm activation level of 20% of the lower explosive limit (LEL-1% by volume).

Sec. [133]147. Section R403.1.4.1. [Change the first] E[e]xception 1[to read]: [One-story detached] Add the phrase "[accessory structures,] excluding garages and carports, used as tool and storage sheds, playhouses and similar uses" after "structures" and [not exceeding] change 600 to 400 [square feet or less in floor area and an eave height of 10 feet (3048 mm) or less shall not be required to be protected. Delete second and third exceptions.] Exception 2. Delete. Exception 3. Delete.

Sec. [134]148. Section R405.1. Add to the title "exterior drainage system". Delete the exception. Add new subsection R 405.1.1. Concrete or masonry foundation interior drainage system. Weep holes at least 2 inches (51 mm) in diameter, spaced at a maximum of 6 feet (1828 mm) on center shall be installed in the footing connecting into the interior drains. Weep-hole inlets shall have a minimum of 6 inches (153 mm) of gravel for the full perimeter of the foundation, extending at least 12 inches (306 mm) from the inlets and covered by a layer of approved filter membrane.

Sec. [135]149. Section R406.1. Delete.

Sec. [136]150. Section R406.2. Delete the first sentence and replace with the following: Exterior foundation walls retaining earth and enclosing usable spaces below grade must be waterproofed with an approved waterproofing system or a membrane extending from the top of the footings to finished grades. Delete items 1, 2, 3, and 4. Add. "Waterproofing system shall be installed as required in the current International Code Council Evaluation Service report for the product."

Sec. [137]151. Section R406.4. Delete.

Sec.152. Section 501.3. Exception 1. Delete the words "Section P2904".

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Sec. [138]153. Section R506.2.3. Delete Exceptions 2 and 4.

Sec. 154. Section R507.2. Delete. Replace with the phrase: "Deck design and construction shall comply with Montgomery County Deck Details homeowners or contractors."

[Sec. 139] [Section R612.2. Window sills. Replace 24 inches (610 mm) with 18" (457 mm).]

[Sec. 140] Section N1101.2. Add 2009 IECC after International Energy Conservation Code and delete the rest of the section.]

Sec. 141155. [Section N1101.3 through Section N1104. Delete.] Delete Chapter 11 Energy Efficiency.

Sec. 142156. Section M.1305.1.3. Add the following after the first sentence: Access to the attic opening shall be provided by a permanent or pull-down stairway in all new construction. In existing installations, portable ladders shall be acceptable.

Sec. [143]157. Section M1405.1. Replace the phrase "Chapters 34 through 43" with National Electric Code (NEC) 2008 adopted in Executive Regulation ER 15-09.

Sec. [144]158. Section M1406.2. Replace the phrase "Chapters 34 through 43" with National Electric Code (NEC) 2008 adopted in Executive Regulation ER 15-09.

Sec. [145]159. Section M1407.1 Replace the phrase "Chapters 34 through 43" with National Electric Code (NEC) 2008 adopted in Executive Regulation ER 15-09.

Sec. [146]160. Chapters 25 through 43. Delete

Sec. [147]161. Add new Chapter 45. Site Work and Safeguards.

Section R4501. Storage and placement. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

Section R4502 [1.] Disposal of Construction Debris/Material. Construction debris and/or materials shall be stored and disposed in a suitable manner so as not to endanger the public and not spread onto the lot and adjoining properties.

Section R450[2]3. Utility connections. Service utility connections shall be discontinued and capped in accordance with the approved rules and the requirements of the authority having jurisdiction.

Section R450[3]4. Excavation and fill for buildings and structures shall be constructed or

protected so as not to endanger life or property.

Section R450[4]5. Fill supporting foundations. A building permit is required when fill is used to support the foundations of any building or structure. Special inspections of compacted fill shall be in accordance with Section 1704.7 of the International Building Code [2009] 2012.

Section R450[5]6. Protection of Pedestrians

Section R450[5]6.1. Protection required. Pedestrians shall be protected during construction, remodeling and demolition activities by a barrier when the distance from the construction to the lot line is 5 feet (1524 mm) or less.

Section R450[5]6.2. Adjacent to excavations. Every excavation on a site located 5 feet (1524 mm) or less from the street lot line shall be enclosed with a barrier. Where located more than 5 feet (1524 mm) from the street lot line, a barrier shall be erected when and where required by the building official.

Section R450[5]6.3. Barriers. Barriers shall be at least 42" high, have adequate strength, and shall be of a type which will warn of potential danger.

Section R450[6]7. Protection of Adjoining Property. Adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs.

Sec. [148] 162. Appendix C. Appendix C is hereby adopted in its entirety.

Sec. [149]163. Appendix E. Appendix E is hereby adopted with the following modification: Delete all except subsections AE501 through AE606, with the following modification to Section AE502.3: In the last sentence, first paragraph, change 12 inches (305) to 24 inches (610).

Sec. [150]164. Appendix F. Appendix F is hereby adopted in its entirety.

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Sec. [151]165. Appendix G. Appendix G is hereby adopted in its entirety, with the following modifications

Section AG101.1, add the following sentence at the end: Swimming Pools, Spas and Hot Tubs shall also comply with Chapter 51 of the Montgomery County Code.

Section AG105.2: Item 1. Change 48 to 60 and 1219 to 1524; Item 9.3. Delete.

Sec. [152]166. Appendix K. Appendix K is hereby adopted in its entirety.

Isiah Leggett, County Executive June 15, 2012 Date

Approved as to form and legality
Montgomery County, Md. County Attorney's Office
By

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
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Montgomery County Regulation on:

ADOPTION OF THE 2012 INTERNATIONAL BUILDING, ENERGY CONSERVATION, MECHANICAL, FUEL-GAS, AND RESIDENTIAL CODES

DEPARTMENT OF PERMITTING SERVICES

Issued by:
The County Executive
Regulation No. 8-12
Authority: Code Sections 8-13 and 8-14
Supersedes: Regulation No. 14-10
Council Review: Method 2 under Code Section 2A-15
Register Vol. 29, Issue 4
Comment Deadline: April 30, 2012
Effective Date:
Sunset Date: None

SUMMARY: This regulation adopts the 2012 editions of the International Building Code (IBC), the International Energy Conservation Code (IECC), the International Fuel Gas Code (IFGC), the International Mechanical Code (IMC), and the International Residential Code (IRC) with amendments. It governs all buildings and structures within Montgomery County.

ADDRESS: Department of Permitting Services
255 Rockville Pike, Second Floor
Rockville, Maryland 20850-4166

STAFF CONTACT: Hadi Mansouri, Chief, Division of Building Construction 240/777-6233

BACKGROUND INFORMATION: Inasmuch as the International Code Council (ICC) publishes the international series (I-series) of construction standards every three years, and the State of Maryland adopts these standards and obligates its political subdivisions to adopt the standards within a specific time period. Montgomery County must adopt these standards within the prescribed period.

Sec. 1. This regulation is adopted pursuant to Sections 8-13 and 8-14 of the Montgomery County Code (MCC), 1994, as amended, and applies to the construction, alteration, addition, repair, removal, demolition, use, location, occupancy, and/or maintenance of all buildings and structures, and their service equipment, within Montgomery County. It supersedes Executive Regulations 14-10, dated February 8, 2011, and all previous regulations adopting the BOCA and the International Code Council (ICC) standards. Its purpose is to

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adopt the 2012 editions of the IBC, the IECC, the IFGC, the IMC, and the IRC with amendments necessary to achieve uniformity and consistency with Maryland and Montgomery County laws and ordinances, as well as department/division policies and procedures. Where this regulation differs from the Montgomery County Fire Safety Code it does not preempt or negate any more restrictive provisions of that code.

Sec. 2. Wherever the IBC references the ICC Electrical Code, replace the reference with Chapter 17 of the Montgomery County Code. Wherever the IBC references the ICC/ANSI A117.1, replace the reference with the Maryland Accessibility Code

AMENDMENTS TO THE 2012 INTERNATIONAL BUILDING CODE (IBC)

Sec. 3. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. 4. Section 101.2. Number the existing exception as #1 and add a second exception (#2) to read as follows: Existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations or additions and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code.

Sec. 5. Sections 101.4.3, and 101.4.4 Delete.

Sec. 6. Section 101.4.1. Delete and replace as follows: The provisions of the International Fuel Gas Code shall apply to the installation of Liquefied Petroleum gas systems and appliances, fuel gas appliances and related accessories as covered in this code. These requirements apply to the inlet connections of appliances and to the installation and operation of residential and commercial gas appliances and related accessories. The provisions of the International Fuel Gas Code apply to the extent that they are adopted in this regulation.

Sec. 7. Section 101.4.5. Add the following at the end of the section. "The provisions of the Montgomery County Fire Safety Code shall also apply."

Sec. 8. Section 102.6. Replace the phrase "the International Property Maintenance Code or" with the phrase "the Montgomery County Fire Safety Code and".

Sec.9. Sections 103, 111, and 113, except 113.2. Delete.

Sec. 10. Section 105.1. Add the following: A separate permit is required for each legal address. A separate permit is required for each separate building at a legal address.

Sec. 11. Section 105.2. Delete all except subsections 105.2.1, 105.2.2, and 105.2.3.

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Sec. 12. Sections 105.3, 105.4, 105.5, 105.6, and 105.7. Delete.

Sec. 13. Section 109.1. Add a second sentence to read: Required fees shall be paid for each separate permit application.

Sec. 14. Section 110.3.10. Add the following: The final inspection must be requested and approved before a building (or portion thereof) including equipments and appliances are used or occupied, whether or not a valid certificate of use and occupancy exists.

Sec. 15. Sections 114 and 115. Delete.

Sec. 16. Section 202. In the definition of Foster Care Facilities, change 2 ½ to 2.

Sec. 17. Section 305.2. Change 2½ to 2.

Sec. 18. Section 308.3.1. In the title and text, change the word "five" to "eight". Delete the phrase "or with Section P2904 of the International Residential Code."

Sec. 19. Section 308.3.2. In the title and text, change the word "six" to "nine".

Sec. 20. Section 308.4.1. Delete the phrase "or with Section P2904 of the International Residential Code."

Sec. 21. Section 308.6.1. Change 2 ½ to 2.

Sec. 22. Section 310.5.1. Add the following:

Exceptions:

1. A family day care home, which is a dwelling in which child day care services are provided: a) in the home where the registrant is the provider and a resident, or where the registrant is not a resident, but more than half of the children cared for are residents; b) for not more than eight children, including the children of the provider, who are less than six years of age, and; c) where staffing complies with state and local regulations, but no more than two non-resident staff members are on site at any time, may be classified as Group R-3, or as a one- or two-family dwelling conforming to the IRC; or

2. A group day care home, which is a dwelling in which child day care services are provided: a) in the home where the licensee is the provider and a resident; b) for nine to 12 children, including the children of the provider, and; c) where staffing complies with state and local regulations, but no more than three non-resident staff members are on site at any time, may be classified as Group R-3, or as a one- or two-family dwelling conforming to

the IRC.

Delete the phrase "or with Section P2904 of the International Residential Code."

Sec. 23. Section 310.6. In the first sentence change "five" to "eight".

Sec. 24. Modify Section 403 as follows:

(a) Section 403.2.1.2. Delete.

(b) Section 403.3.2. Add the phrase, "In buildings that are more than 420 feet (128 m) in building height," to the beginning of the section.

Sec. 25. Section 403.4.5. Delete the phrase "Section 510 of the International Fire Code" and replace with "Section 915 of this Code".

Sec. 26. Section 422.4. Change "30" to "15". Change "2.8" to "1.4" and change "nonambulatory patient" to "occupant".

Sec. 27. Chapter 4. Add a new section 425 Residential Occupancies.

425.1 All R occupancies shall have appropriate radon control features prescribed in Appendix F in the International Residential Code, 2012 edition.

Sec. 28. Section 501.2. Delete "and existing" in the first line. In the second sentence, Change the phrase "4 inches (102 mm)" to "6 inches (153 mm), except R-3 occupancies which shall be permitted to be 5 inches (127 mm),".

Sec. 29. Section 510.2. Add two more conditions as follows:

8. For purposes of determining the number of stories above grade, a story above the 3-hour horizontal assembly shall be considered a story above grade regardless of the location of the average grade plane.

9. A fire command center complying with Section 911 shall be provided.

Sec. 30. Section 703.7. Amend item 3 to add a sentence as follows: "The sign or stenciling shall identify the fire resistance rating in hours."

Sec. 31. Section 713.14.1. Add the following sentence at the end of the section: Where an

enclosed elevator lobby is provided, exit access corridors shall not be interrupted by an elevator lobby.

Sec. 32. Section 717.5.3. Replace the first sentence of Exception 2 with the following: "In buildings, other than Group H occupancies, equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, smoke dampers are not required where:"

Sec. 33. Section 903.1.1. Delete and replace with the following: 903.1.1 Alternative Protection. Where automatic sprinkler systems are required by this code; and, where water as an extinguishing agent is not compatible with the fire hazard, or is prohibited by a law, statute, or ordinance, the affected area shall be protected by an approved automatic fire-extinguishing system utilizing an extinguishing agent that is compatible with the fire hazard.

Sec. 34. Section 903.2.1.2. Add a fourth condition to read as follows:

4. The assembly occupancy is one of the following (1) Bars with live entertainment, (2) Dance halls, (3) Discotheques, (4) Nightclubs, or (5) Assembly occupancies with festival seating as defined in the Life Safety Code, 2009 edition.

Sec. 35. Section 903.2.8. Add an exception to read as follows:

An automatic sprinkler system throughout the building is not required when all of the following conditions are met:

1. The building is a mixed use building, that is not otherwise required to be protected throughout by automatic sprinklers;
2. There is only one dwelling unit in the building;
3. The dwelling unit is separated from the remainder of the building by fire barriers in accordance with Section 707 and horizontal assemblies in accordance with Section 711 having a fire resistance rating not less than 2 hours;
4. The means of egress from the dwelling unit is independent from the other occupancies; and,
5. The dwelling unit is protected throughout with automatic sprinklers. The automatic sprinkler system installed for this exception shall be permitted to be designed in accordance with Section 903.3.1.3.

Sec. 36. Section 903.2.8.2. Change "five" to "eight"

Sec. 37. Section 905.3. After the section title add the following two sentences:

In new installations where the code requires either Class II or III standpipes, Class I standpipes shall be installed. Occupant use hose is prohibited in new or existing buildings.

Sec. 38. Section 908.7. Add the following sentence after the sentence ending in "manufacturer's instructions": "At a minimum, a carbon monoxide alarm shall be installed outside each sleeping area."

Sec. 39. Section 909.9. Add the following sentence at the end of the section: In all cases, the design fire size shall not be less than 5000 Btu/s (5275 kW) unless approved by the building official and the fire official.

Sec. 40. Section 909.16. In the third sentence, replace the words "approved location adjacent to the fire alarm control panel" with "location approved by the building official and the fire official".

Sec. 41. Section 911.1.1. Replace with the following, "The fire command center shall have a door directly to the exterior of the building on the address side. The exterior door to the fire command center shall be within 50 feet of a fire department access road. A fire department access box shall be provided within 6 feet of the exterior door to the fire command center. The exterior door to the fire command center shall be identified on the exterior face as the fire command center in a manner acceptable to the fire official."

Sec. 42. Section 911.1.5.

Amend item 2 to read "The fire department communications system which may include an in-building public safety radio enhancement system monitoring panel."

Amend item 11 to read "Fire pump status indicators and remote starting."

Add an item 19 which reads, "A shunt trip device to disconnect the electrical service to the building."

Sec. 43. Section 915.1. Replace with the following: Emergency responder radio coverage shall be assured in all newly constructed below ground floors of a building, all floors in buildings greater than 25000 ft^2 per floor, and to all floors of buildings greater than 3 stories in height. One- and two-family dwellings and townhouses are exempt from this requirement.

Sec. 44. Add Sections 915.2 and 915.3 as follows:

Section 915.2. Every floor area in a building or structure which can not achieve the required level of emergency responder radio coverage as established by Montgomery County Department of Technology Services shall be provided with an in-building public safety radio enhancement system in accordance with the Montgomery County Fire Safety

Code.

Section 915.3. Inspection and Testing. Emergency responder radio coverage and in-building public safety radio enhancement system must be tested, and inspected by approved individuals. The results of the testing and inspection shall be certified to the code official prior to issuance of an occupancy permit.

Sec. 45. Section 1001.1. Add the following to the end of the section: "The means of egress shall also comply with the requirements in the Life Safety Code, 2009 edition."

Sec. 46. Section 1003.5. In exception #2, replace the phrase "a single riser or with two risers and a tread" to "three risers or less". Add the following at the end of exception #2: "The presence and location of each step shall be marked in accordance with NFPA 101, Section 7.2.2.5.4.3."

Sec. 47. Table 1004.1.2. Add an entry for "Shell Office Spaces" with an occupant load factor of 65 gross square feet per person. Add an entry for "Tennis Courts (within the area of play)" with an occupant load factor of 50 net square feet per person.

Sec. 48. Section 1005.3.1. Delete the exception.

Sec. 49. Section 1005.3.2. Delete the exception.

Sec. 50. Section 1008.1.2. Add a sentence at the end to read: "Doors in exit enclosures shall swing in the direction of egress travel unless the door opening serves an individual living unit that opens directly into an exit enclosure."

Sec. 51. Section 1008.1.9.11. In Exception #3, delete all text after the phrase "...openable from the egress side".

Sec. 52. Section 1009.16. At end of the section add the phrase "or ladder complying with Section 7.2.9 of the Life Safety Code, 2009 edition".

Sec. 53. Section 1012.6. At the end of the last sentence add the phrase "unless, in the opinion of the AHJ, an extension in the same direction of the stair or ramp creates a hazard in the means of egress."

Sec. 54. Section 1012.7. Change "1 ½" to "2 ¼" and change "38" to "57".

Sec. 55. Section 1013.2. After the phrase "equipment platforms," add the phrase "retaining walls,".

Sec. 56. Section 1013.3. In exception #2 and #3, change "34 inches (864 mm)" to "36 inches (915

mm)". Add a sixth exception: Exception 6. In occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, interior guards shall be permitted to be not less than 36 inches high.

Sec. 57. Section 1013.4. Delete Exception #6.

Sec. 58. Section 1013.8. Add two exceptions (#5 and #6) to read as follows:
Exception #5: In buildings four stories or less, the lowest part of the clear opening of the window shall be permitted to be at a height not less than 18 inches (457mm) above the finished floor surface of the room in which the window is located.
Exception #6: In buildings four stories or less, glazing between the floor and a height of 18 inches (457mm) shall be fixed or have openings through which a 4-inch (102mm) sphere cannot pass.

Sec. 59. Section 1014.3. Add the following to the end of the section: "See also the requirements in the Life Safety Code, 2009 edition."

Sec. 60. Section 1015.6. Change 2 ½ to 2.

Sec. 61. Section 1018.1. Replace Exception 4 with the following: A fire resistance rating is not required for corridors within single-tenant Group B occupancies.

Sec. 62. Section 1020. Add a new section 1020.3 to read as follows:

Section 1020.3. Fire Department Access to Floors. Not less than one exit stair which serves all stories of the building shall be accessible by an internal corridor from the main entrance of the building or the fire department response location.

Sec. 63. Section 1027.1, Exception 1, Item 1.1. Add two sentences at the end of the item that read as follows:

The door to the exterior of the building shall be in direct sight of the point of the termination of the exit. For the purposes of this section, the use of exit signs or other exit markings shall not be considered as making the way to the exterior "readily visible and identifiable".

Sec. 64. Chapter 11. Delete and replace with the Maryland Accessibility Code.

Sec. 65. Section 1603.1.4 Add to Item 1. The ultimate design wind speeds in miles per hour in Montgomery County for risk categories I, II, III, and IV are 105, 115, 120, and 120, respectively. The corresponding nominal design wind speeds in miles per hour are 82, 89, 93, and 93, respectively.

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Sec. 66. Section 1603.1.5. Add to Item 3. The mapped spectral response acceleration parameters for Montgomery County for short-period, S_s, and 1-second, S_1, shall be 12.5% and 5.5%, respectively.

Sec. 67. Table 1607.1 Item 26 Roofs. Modify the uniform live load value for "Ordinary flat, pitched and curved roofs (that are not occupiable)" to 30 pounds per square foot, nonreducible.

Sec. 68. Section 1607.7.2. Modify Item 1 to read as follows:
The maximum fire truck operating weight is 85,000 pounds distributed in three axles spaced 19 feet 6 inches and 4 feet 6 inches apart. The transverse wheel distance is 8 feet 2 inches. The front axle weighs 23,000 pounds and rear axles weigh 31,000 pounds each. When the ladder is up, the vehicle is raised and supported on four (4) outriggers spaced 10 feet apart along the length of the vehicle and 16 feet apart in the transverse direction. Depending upon the position of the ladder, any pair of two front, side or rear outriggers apply to the structure a force of 123,552 pounds (61,776 pounds per outrigger in accordance with NFPA 1901, Chapter 20.21.4.2) and the remaining two outriggers apply a force of zero (0) pounds. Outrigger pad dimensions are 2 feet 2 inches wide by 2 feet 6 inches long.

Sec. 69. Section 1608.2. After the title add the following sentence: "Design ground snow loads for Montgomery County shall be not less than 30 pounds per square foot."

Sec. 70. Section 1612.3. After the heading, delete the text and replace with the following: The flood hazard map of Montgomery County is established in Section 3 of Executive Regulation 24-06 AM, Floodplain Regulations, per the authority in Article III, Chapter 19 of the Montgomery County Code.

Sec. 71. Section 1705.2.1. Modify AISC 360 Chapter N, Section N1, First User Note: Delete the sentence starting with "Additionally, where...".

Sec. 72. Section 1705.2.1. Modify AISC 360 Chapter N, Section N5.5b: After "minimum design loads for buildings and other structures" add "or IBC Table 1604.5".

Sec. 73. Section 1705.2.1. Modify AISC 360 Chapter N, Section N5.5b: Add at the end of the paragraph "unless a higher percentage is required by the structural engineer of record".

Sec. 74. Section 1705.2.1. Modify AISC 360 Chapter N, Section N5.5b, User Note: Add at the end of the user note "unless otherwise specified by the structural engineer of record".

Sec. 75. Section 1705.2.1. Modify AISC 360 Chapter N by deleting Section N7 and replace with IBC Section 1704.2.5.

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Sec. 76. Section 1705.3. Delete Exception 1.

Sec. 77. Section 1705.3. Delete Exception 2.3. Amend exception 2.1 by adding the word "or" after the semicolon. Amend exception 2.2 by deleting the word "or".

Sec. 78. Table 1705.3 Items 10 and 11. Modify the inspection frequency from "periodic" to "continuous".

Sec. 79. Table 1705.3 Item 11. Add the sentence to the first column, "The strength evaluation shall be demonstrated by field cured cylinders only."

Sec. 80. Table 1705.6 Item 1. Modify the inspection frequency from "periodic" to "continuous".

Sec. 81. Add a new section as follows: Section 1801.3 Special conditions. Design and construction of all buildings and structures within 1000 feet of a known municipal solid waste (MSW) landfill site that does not currently have an operational land fill gas (LFG) monitoring and removal system, shall require special engineering of foundation systems, including walls and floor slabs, to provide for the safety of occupants against hazards from LFG concentration. Special subsurface investigations shall be conducted, at the owner's expense, by an approved and qualified engineer or geologist to determine the extent of the potential hazard. The study must identify the potential hazards, and mitigation plans for the site must be incorporated into the construction documents and approved prior to issuance of a building permit. All buildings and structures within 1000 feet of the boundary of a MSW landfill shall be equipped with a methane gas detector with an alarm activation level of 20% of the lower explosive limit (LEL 1% by volume).

Sec. 82. Section 1809.5. In item number 1, after the word "locality" insert: "Depth shall be a minimum of 30 inches below the adjacent finish grade."

Sec. 83. Add a new section as follows:

1901.2.1. For precast structures, in the case of a conflict between ACI 318 and PCI Design Handbook, the requirements of ACI 318 shall control the design.

Sec. 84. Chapter 29. Delete. Plumbing regulations are administered by the local water authority.

Sec. 85. Sections 3001.2, 3001.3, and 3001.4. Delete and replace with the following: 3001.2 Standards. The Maryland Department of Labor, Licensing, and Regulation, Division of Labor and Industry, regulates the design, installation, inspection, and testing of all hoisting and conveying equipment.

Sec. 86. Section 3107.1. Add the following at the end of the sentence: "and Chapter 59 of the

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Montgomery County Code, 1994, as amended."

Sec. 87. Section 3109.3. Change "4 feet (1290 mm)" to "5 feet (1524 mm)".

Sec. 88. Section 3109.4.1. Change "48 inches (1219 mm)" to "60 inches (1524 mm)".

Sec. 89. Section 3302. Add a new section 3302.3 which reads "Construction safeguards shall also comply with NFPA 241, Standard for Safeguarding Construction, Alteration and Demolition Operations, 2004 edition."

Sec. 90. Section 3401.1. Add the following at the end of the sentence: Existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations or additions and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code. Buildings undergoing repair, alterations, additions and change of occupancy shall also comply with the Montgomery County Fire Safety Code.

Sec. 91. Appendix F. Appendix F is hereby adopted in its entirety.

Sec. 92. Appendix G. Appendix G is hereby adopted in its entirety and amended as follows:

Section G102.1. Insert after International Building Code the phrase "and the provisions of Article III, Chapter 19 of the Montgomery County Code, and Executive Regulation 24-06 AM."

Section G102.2. Replace the parentheses and the phrase within the parentheses with the effective date of this regulation.

Sec. 93. Appendix H. Appendix H is hereby adopted in its entirety and amended as follows:

Section H 101.1. Insert at the beginning of this section "The provisions of this chapter shall apply to signs that are permitted by the Montgomery County Zoning Ordinance".

Section H 101.2. Delete.

Section H102.1. Delete definitions for "Combination sign", "Display Sign", "Pole Sign", "Portable Display Surface", and "Projecting Sign."

Section H102.1. Add definition of "Supported Sign" as follows: 'A sign that is attached to a structure like a pole, column, frame, or brace, as its sole means of support, and is not a ground sign and is not attached to a building.

Section H102.1. Delete and replace the definition of "sign" as follows: "Any device, fixture, placard, or structure that uses any color, form, graphics, illumination, symbol, or

writing to attract attention or to communicate information".

Section H102.1. Delete and replace the definition of "ground sign" as follows: "A sign erected on the ground or with its bottom edge within 12 inches of the ground, that has its support structure as an integral part of the sign, and where the dimensions closest to the ground is greater than height.

Section H102.1. Delete and replace the definition of "wall sign" as follows: "Any sign that is attached to the wall of a building. There are two types of wall signs: Flat wall sign: A sign that is parallel to the wall of a building to which it is attached, but does not extend more than 12 inches from the building face; Projecting wall sign: A sign that is attached to a wall of a building and extends more than 12 inches from the building face.

Section H104. Delete.

Section H108. Delete.

Section H109. Add the words "and supported" between "ground" and "sign" in the title and in the first two sentences of H109.1

Section H109.2. Delete.

Section H110. Delete the text of H110.1 (including the exception) and replace with the following "Roof signs are prohibited." Delete Sections H110.2 through H110.5.

Section H111.3. Add the word "wall" between "projecting" and "sign".

Section H112. Add the word "wall" between "projecting" and "sign" in the title and first sentence.

Section H112.4. In the first sentence, delete all text starting with the word "except".

Section H113. Delete.

Section H114. Delete the word "roof" in the first sentence.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
Originating Department: Department of Permitting Services	Effective Date:

AMENDMENTS TO THE 2012 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)

Sec. 94. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

AMENDMENTS TO THE 2012 INTERNATIONAL MECHANICAL CODE (IMC)

Sec. 95. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. 96. Section 101.2. Add exception to read as follows: Mechanical systems in existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations, or additions, and change of occupancy shall be permitted to comply with the International Existing Building Code.

Sec. 97. Sections 106.4.3, 106.4.4, 106.5, and 109. Delete.

Sec. 98. Add new section 302.6 Supports and Anchorage. All appliances located on roofs shall rest on a manufacturer's standard perimeter support, self flashing roof curb, framed steel support, or 4 X 4 treated lumber as a minimum. The appliances shall be securely affixed in an approved manner to resist vibration and wind loads.

Sec. 99. Add new section 306.1.1.1 Heating Appliances. Electric, fossil or solid fuel fired appliances shall not be installed under any stairway or landing.

Sec. 100. Section 306.3. After the last sentence add the following: Access to the attic opening shall be provided by a permanent or pull-down stairway in all new construction. In existing installations, portable ladders shall be acceptable.

Sec. 101. Section 506.1 Add the words "and NFPA 96." to the end of the first sentence and the sentence "Where discrepancies occur the most astringent will apply." after the first sentence.

Sec. 102. Section 506.3.2.5 Change "100" to "300".

Sec. 103. Section 506.3.9 Change the heading to "Grease Duct Vertical and Horizontal Cleanouts".

Subsection 1. Change "20 feet" to "12 feet". Add subsection 7. to read; "Vertical rises where personal entry is not possible, adequate access for cleaning shall be provided on each floor level".

Sec. 104. Section 506.3.12.2 After the last sentence add "Follow NFPA 96 section 7.8.3 for additional termination requirements."

Sec. 105. Section 606.2.1 Under the heading exception, add the words "Return air" to the beginning of the first sentence. After the last sentence add "Supply smoke detectors shall not be required for fan units whose sole purpose is to remove air from the inside of the building to the outside of the building. (NFPA90A)

Sec. 106. Section 606.2.1 Add to the words "Supply and" to the beginning of the heading. Add the words "supply and" after the word "in" in the first sentence and add "in the supply air duct or plenum downstream of the air filters and ahead of any branch connections," after (0.9 m3/s) in the first sentence.

Sec. 107. Section 607.5.5 exception 2 Replace the first sentence of Exception 2 with the following: "In buildings, other than Group H occupancies, equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, smoke dampers are not required where:"

Sec. 108. Add new section 608 Emergency and Standby Power Systems

Sec. 109. Add new section [F] 608.1 Installation. Emergency and standby power systems required by the International Fire Code or the International Building Code shall be installed in accordance with NFPA 110 , NFPA 111 and the International Fire Code. Existing installations shall be maintained in accordance with the original approval.

Sec. 110. Add new section [F] 608.1.1 Stationary Generators. Stationary emergency and standby power generators required by the International Building Code and the International Fire Code shall be listed in accordance with UL 2200.

Sec. 111. Add new section [F] 608.2 Standby Power. Where the standby system is a generator set inside a building, the system shall be located in a separate room enclosed with a 2-hour fire barrier constructed in accordance with section 707 or horizontal assemblies constructed in accordance with section 712 of the International Building Code, or both. System supervision with manual start and transfer features shall be provided at the fire command center.

Sec. 112. Add new section 608.2.1 Ventilation Air. Ventilation air shall be supplied directly from a

source outside the building by an exterior wall opening or from a source outside the building by a 2-hour fire rated air transfer system. (NFPA 110)

Sec. 113. Add new section 608.2.2 Discharge air. Discharge air shall be directed outside the building by an exterior wall opening or to an exterior opening by a 2-hour rated air transfer system. (NFPA 110)

Sec. 114. Add new section 608.2.3 Fire Dampers. Fire dampers, shutters or other self closing devices shall not be permitted in ventilation or discharge air openings or ductwork for standby power systems. (NFPA 110)

Sec. 115. Add new section 608.2.4 Motor Operated Damper. Motor operated dampers, when used, shall be spring operated to open and motor closed. (NFPA 110)

AMENDMENTS TO THE 2012 INTERNATIONAL FUEL GAS CODE (IFGC)

Sec. 116. Section 101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. 117. Section 102.2.1. Delete and replace to read as follows: As an alternative to the provisions of this code, fuel-gas piping systems, fuel-gas utilization equipment and related accessories in existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations, or additions, and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code.

Sec. 118. Sections 106.5.3, 106.5.4, 106.6, and 109.2 to 109.7 Delete.

Sec. 119. Chapter 4. Delete all except Sections 401.2, 402.6.1, 412, 413, and 414.

AMENDMENTS TO THE 2012 INTERNATIONAL RESIDENTIAL CODE (IRC)

Sec. 120. Section R101.1. Replace the parentheses and the phrase in the parentheses with "Montgomery County, Maryland."

Sec. 121. Section R101.2. Add New Exception to read as follows: "Existing buildings, as defined by the Maryland Building Rehabilitation Code, undergoing repair, alterations or additions and change of occupancy shall be permitted to comply with the Maryland Building Rehabilitation Code." Delete Exceptions 1 and 2.

Sec. 122. Section 102.7. Delete the phrase "the International Property Maintenance Code."

Sec. 123. Section R105.2, Delete Items 1 & 2: Item 3: Change 4 to 4 ½ and 1219 to 1372. Item 7:

Delete "swimming" and change 24 (610 mm) to 18 inches (457 mm). Item 8: Add "playhouses, treehouses or similar structures" after first word. Delete Item 10. Add Item 11: Replacing windows and doors without changing the size of openings and without reducing the net clear opening dimensions. Add Item 12: Replacing roofing or siding materials with in kind materials. Delete Sections R105.3.1.1, R105.3.2, and R105.5.

Sec. 124. Section 107. Delete.

Sec. 125. Section R108.1. Replace the second sentence with the following: Required fees shall be paid for each separate permit application. Sections 108.2 through 108.5. Delete.

Sec. 126. Sections R109.1 through R109.1.6. Delete all except R109.1.2, R109.1.5, and R109.1.5.1 and replace with the following: R109.1 Types of inspections. The following inspections must be conducted for all buildings and structures:

1. Sign: The sign must be posted on the property within 3 days after the permit issuance date and must remain posted on the property for 30 days. The sign must be located on the side of the lot/parcel, which provides principal access to the street or right-of-the-way. It must be conspicuously posted not more than 5 feet from the front property line and mounted at least 30 inches, but not more than 60 inches, above the ground. NO BUILDING INSPECTION WILL BE PERFORMED PRIOR TO THE APPROVAL OF THIS INSPECTION.

2. Footings: Conducted prior to concrete placement and after excavations for all footings and thickened slabs are completed; after form work, reinforcing steel, concrete-encased electrode (for new dwellings), and grade stakes are in place; and after sediment control measures are installed according to the approved sediment control plan.

3. Waterproofing/Foundation Drainage: Conducted after the exterior walls have been waterproofed and foundation drainage system has been installed. Insulation, if used, shall be in place and protected as required. If interior drain tiles are to be used, weep holes (2 in. minimum diameter, 6 feet on center) must be installed. A second inspection may be required prior to backfilling the interior drainage system.

4. Concrete slab-on-ground floor: After the installation of the slab base, vapor retarder, slab edge insulation, and a minimum 3 in. schedule 40 PVC, or equivalent gas tight pipe inserted into a 3 in. tee embedded into the slab base for the venting of RADON GAS and labeled adequately. Where the sump crock is to be used for the venting of RADON GAS, it must be in place at the time of the inspection. Additions to an existing building that has the final inspection older than a year does not require a radon control system.

5. Wall check (house location survey): The owner must have a house location survey

prepared and certified by a Maryland Registered Land Surveyor and must submit a copy to the building official for approval prior to erecting the framing. A wall check not identified by a premise address and permit number will not be accepted. A FRAMING INSPECTION WILL NTO BE CONDUCTED WITHOUT AN APPROVED WALL CHECK.

6. Masonry fireplace/chimney: Conducted after the fireplace and first flue liner section are completed.

7. Wall Bracing: Conducted prior to installation of weather-resistive barrier (house wrap).

8. Framing ("close-in"): Conducted after the completion of all framing, air sealing, rough wiring, fire sprinkler system installation and testing, plumbing, gas and mechanical distribution systems (as required) but prior to installing exterior finish, insulation and drywall. Roof is to be completed and weatherproof. The exterior finish is not to be installed until framing (close-in) has been approved. When plumbing/gas work is part of the construction, a Washington Suburban Sanitary Commission (WSSC) plumbing inspection must be approved before requesting a framing inspection. The building, electrical, and mechanical inspections must be requested at the same time. WHEN FLOOR FRAMING IS LESS THAN 36 INCHES (914 MM) ABOVE THE SURFACE BELOW, A FRAMING INSPECTION SHALL BE REQUESTED PRIOR TO INSTALLATION OF ANY FLOOR MATERIALS.

9. Insulation: Conducted after the FRAMING (close-in) inspection has been approved to verify that the installed insulation R-value matches the approved plans or specifications for the building.

10. Swimming Pool Bonding – Conducted when the pool has been formed with the rebar installed and bonded prior to placement of concrete or backfill. During construction pool excavations must be completely enclosed by a 42 in. high safety fence AT ALL TIMES when work is not being performed in the pool.

11. Well and Septic Systems: Where a building is served by an on-site water system or an on-site sewage disposal system, prior to the final inspection, an "Interim Certificate of Portability" or "Certificate of Portability" and/or a "Certificate of Sewage Disposal", as appropriate, must be issued by the Department. Where a building is served by an on-site water system or an on-site sewage disposal system, any condition of the permits issued for those systems shall be satisfied prior to the final inspection.

12. Final and U/O: Conducted after the building is completed and ready for occupancy, but prior to settlement on the house, unless the contract owner waives the requirement for final inspection and provides the building official with a written copy of the waiver. For new construction, final electrical, mechanical, and sprinkler inspections must be

requested with the final building inspection, and the address numbers must be displayed in accordance with the requirements of the fire code. Note: A final approval from WSSC shall be obtained for all plumbing/gas installations prior to requesting final building inspections from the County. The final approval for sprinkler final inspection, duct blaster and blower door tests certifications, if required, shall be obtained prior to the request for a final inspection. If an owner refuses access within a reasonable time after a house is completed, the building official may close the permit file, but this action will not relieve the owner from any obligation to comply with applicable codes. The final inspection must be requested and approved before a building (or portion thereof) is used or occupied.

13. Partial Inspection: Conducted upon request. A $121.00 fee must be paid, at the DPS office, when scheduling this inspection.

14. Re-inspection: Any of the above inspections disapproved twice for the same violation will be subject to a re-inspection fee, as established in the Schedule of Fees for Permits, Licenses and Certifications, which must be paid before any further inspections will be performed at the building site.

Sec. 127. Sections R110.2 Delete.

Sec. 128. Sections R110.3 Item 3. Delete the words "name" and "owner" and add "building or structure". Delete Item 6. Delete Item 8.

Sec. 129. Sections R110.4 Delete.

Sec. 130. Sections R112. Delete except R112.2.

Sec. 131. Section R202. To the definition dwelling unit add: A dwelling unit may contain a family day care home, group day care home, a home occupancy or home health care practitioner complying with Chapter 59, Montgomery County Code. Note: A certificate of use and occupancy is required before any space dedicated for home occupancy or home health care practitioner can be used or occupied. See Chapters 8 and 59, Montgomery County Code.

Delete words "for living" from the definition of "Guestrooms"

Delete definition of "Lodging House"

Add definition for Storage, finished: A finished area having no more than two (2) 120V outlets and no other wiring methods (CATV, satellite, data communication, etc.), excluding lighting requirements.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
Originating Department: Department of Permitting Services	Effective Date:

Sec. 132.	Table R301.2(1). Under the headings indicated insert the appropriate criteria, as follows: GROUND SNOW LOAD--30 pounds per square foot (psf); WIND-Speed--90 miles per hour (mph); TOPOGRAPHIC EFFECTS---No; SEISMIC DESIGN CATEGORY—B; SUBJECT TO DAMAGE FROM-Weathering—severe, Frost line depth—24 inches (612 mm), Termite—moderate to heavy, and Decay—slight to moderate; WINTER DESIGN TEMP—13 degrees Fahrenheit (F); ICE SHIELD UNDERLAYMENT REQUIRED—yes; footnote h; FLOOD HAZARDS—yes; footnote g: (a), (b) July 2, 1979; AIR FREEZING INDEX—300; MEAN ANNUAL TEMPERATURE—55.
Sec. 133.	Section R305.1, Exception 1. Delete the first occurrence of the word "required." Delete the phrase "and no portion of the required floor may have a ceiling height of less than 5 feet (1524 mm)." and replace it with the phrase "Any floor area having less than 5 feet (1524 mm) of ceiling height shall not be considered part of the room area and shall not be allowed to have any permanent fixtures or furnishings such as, but not limited to, cabinets, counters, and shelves." Sections R305.1.1. Delete.
Sec. 134.	Sections R307.1. Delete "and in accordance with the requirements of Section P2705.1"
Sec. 135	Delete Section R309.5
Sec. 136	Delete Exception in R310.2.2.
Sec. 137.	Section R312.1. After the first occurrence of the phrase "floor or grade below" insert the phrase "and retaining walls with a difference in grade level on either side of the wall exceeding 30 inches (762 mm) and within 2 feet (610 mm) of a defined walkway, path, parking lot, or driveway on the high side."
Sec. 138.	Section R313.1.1. Replace Section P2904 with NFPA 13D.
Sec. 139.	Section R313.2.1. Delete "Section P2904 or".
Sec. 140.	Add new subsection R313.3. Rehabilitation work in one- and two- family dwellings and townhouses equipped with an approved sprinkler system. An approved automatic fire sprinkler system shall be protected from damage in areas undergoing rehabilitation work. Add new subsection R313.4. Automatic sprinkler system for reconstruction. An approved automatic fire sprinkler system shall be installed when 50 percent or more of the gross floor area as defined in section 1002.1 of the IBC of the existing building is demolished.
Sec. 141	Section R314.3.1. Exception 2. Add "and electrical" after the word "plumbing"
Sec. 142	Section R319.1 Change "4 inches (102 mm)" to "5 inches (122.5 mm).

Sec. 143. Section R321.1 Add a new sentence. Walls and ceiling of elevator shafts shall be covered with by not less than 5/8-inch (15.9 mm) Type X gypsum board.

Sec. 144. Section R321.3. Delete.

Sec. 145. Section R322.1. To the first paragraph add the phrase "and the Floodplain District Requirements, Article III, Chapter 19, of the Montgomery County Code, and Executive Regulation 24-06 AM."

Sec. 146. Add a new section as follows: Section R401.5. Special conditions. Design and construction of all buildings and structures within 1000 feet of a known municipal solid waste (MSW) landfill site that does not currently have an operational land fill gas (LFG) monitoring and removal system, shall require special engineering of foundation systems, including walls and floor slabs, to provide for the safety of occupants against hazards from LFG concentration. Special subsurface investigations shall be conducted, at the owner's expense, by an approved and qualified engineer or geologist to determine the extent of the potential hazard. The study must identify the potential hazards, and mitigation plans for the site must be incorporated into the construction documents and approved prior to issuance of a building permit. All buildings and structures within 1000 feet of the boundary of a MSW landfill shall be equipped with a methane gas detector with an alarm activation level of 20% of the lower explosive limit (LEL-1% by volume).

Sec. 147. Section R403.1.4.1. Exception 1: Add the phrase: "excluding garages and carports, used as tool and storage sheds, playhouses and similar uses and not exceeding change 600 to 400 square feet or less in floor area and an eave height of 10 feet (3048 mm) or less shall not be required to be protected. Exception 2. Delete. Exception 3. Delete.

Sec. 148. Section R405.1. Add to the title "exterior drainage system". Delete the exception. Add new subsection R 405.1.1. Concrete or masonry foundation interior drainage system. Weep holes at least 2 inches (51 mm) in diameter, spaced at a maximum of 6 feet (1828 mm) on center shall be installed in the footing connecting into the interior drains. Weep-hole inlets shall have a minimum of 6 inches (153 mm) of gravel for the full perimeter of the foundation, extending at least 12 inches (306 mm) from the inlets and covered by a layer of approved filter membrane.

Sec. 149. Section R406.1. Delete.

Sec. 150. Section R406.2. Delete the first sentence and replace with the following: Exterior foundation walls retaining earth and enclosing usable spaces below grade must be waterproofed with an approved waterproofing system or a membrane extending from the top of the footings to finished grades. Delete items 1, 2, 3, and 4. Add. "Waterproofing system shall be installed as required in the current International Code Council Evaluation

Service report for the product."

Sec. 151. Section R406.4. Delete.

Sec. 152. Section R501.3. Exception 1. Delete the words "Section P2904".

Sec. 153. Section R506.2.3. Delete Exceptions 2 and 4.

Sec. 154. Section R507.2. Delete. Replace with the phrase: "Deck design and construction shall comply with Montgomery County Deck Details homeowners or contractors."

Sec. 155. Delete Chapter 11 Energy Efficiency.

Sec. 156. Section M.1305.1.3. Add the following after the first sentence: Access to the attic opening shall be provided by a permanent or pull-down stairway in all new construction. In existing installations, portable ladders shall be acceptable.

Sec. 157. Section M1405.1. Replace the phrase "Chapters 34 through 43" with National Electric Code (NEC) 2008 adopted in Executive Regulation ER 15-09.

Sec. 158. Section M1406.2. Replace the phrase "Chapters 34 through 43" with National Electric Code (NEC) 2008 adopted in Executive Regulation ER 15-09.

Sec. 159. Section M1407.1. Replace the phrase "Chapters 34 through 43" with National Electric Code (NEC) 2008 adopted in Executive Regulation ER 15-09.

Sec. 160. Chapters 25 through 43. Delete

Sec. 161. Add new Chapter 45. Site Work and Safeguards.

Section R4501. Storage and placement. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

Section R4502. Disposal of Construction Debris/Material. Construction debris and/or materials shall be stored and disposed in a suitable manner so as not to endanger the public and not spread onto the lot and adjoining properties.

Section R4503. Utility connections. Service utility connections shall be discontinued and capped in accordance with the approved rules and the requirements of the authority having jurisdiction.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
Originating Department: Department of Permitting Services	Effective Date:

Section R4504. Excavation and fill for buildings and structures shall be constructed or protected so as not to endanger life or property.

Section R4505. Fill supporting foundations. A building permit is required when fill is used to support the foundations of any building or structure. Special inspections of compacted fill shall be in accordance with Section 1704.7 of the International Building Code 2012.

Section R4506. Protection of Pedestrians

Section R4506.1. Protection required. Pedestrians shall be protected during construction, remodeling and demolition activities by a barrier when the distance from the construction to the lot line is 5 (1524 mm) feet or less.

Section R4506.2. Adjacent to excavations. Every excavation on a site located 5 feet (1524 mm) or less from the street lot line shall be enclosed with a barrier. Where located more than 5 feet (1524 mm) from the street lot line, a barrier shall be erected when and where required by the building official.

Section R4506.3. Barriers. Barriers shall be at least 42" high, have adequate strength, and shall be of a type which will warn of potential danger.

Section R4507. Protection of Adjoining Property. Adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs.

Sec. 162. Appendix C. Appendix C is hereby adopted in its entirety.

Sec. 163. Appendix E. Appendix E is hereby adopted with the following modification: Delete all except Sections AE501 through AE606, with the following modification to Section AE502.3: In the last sentence, first paragraph, change 12 inches (305) to 24 inches (610).

Sec. 164. Appendix F. Appendix F is hereby adopted in its entirety.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive. 101 Monroe Street. Rockville, Maryland 20850

Subject: Adoption of the 2012 IBC, IRC, IECC, IMC, IFGC	Number: 8-12
Originating Department: Department of Permitting Services	Effective Date:

Sec. 165. Appendix G. Appendix G is hereby adopted in its entirety, with the following modifications

Section AG101.1, add the following sentence at the end: Swimming pools, Spas and Hot Tubs shall also comply with Chapter 51 of the Montgomery County Code.

Section AG105.2: Item 1. Change 48 to 60 and 1219 to 1524; Item 9.3. Delete.

Sec. 166 . Appendix K. Appendix K is hereby adopted in its entirety.

Isiah Leggett, County Executive — June 18, 2012 Date

Approved as to form and legality
Montgomery County, Md. County Attorney's Office
By: Malcolm F. Spruce

MARYLAND-NATIONAL CAPITAL BUILDING INDUSTRY ASSOCIATION
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April 30, 2012
Via E-Mail

Mr. Hadi Mansouri
Montgomery County Department of Permitting Services
Division of Building Construction
255 Rockville Pike, 2nd Floor
Rockville, Maryland 20850

Subj: MCER 8-12, Adoption of the 2012 International Building, Energy Conservation, Mechanical, Fuel Gas, and Residential Codes

Dear Hadi:

The Maryland-National Capital Building Industry Association (MNCIA) is pleased to follow up on our April 18th testimony concerning proposed Montgomery County Executive Regulation No. 8-12.

In particular, we would like to provide comments on the real world implications of the 2012 IECC requirements which led us to propose the following two priority energy code amendments which are attached:

A. Reinstate energy neutral equipment trade-offs in the performance section of the 2012 IECC Residential Energy Efficiency, and

B. Allow for energy neutral performance trade-offs for air leakage levels exceeding the overly stringent and problematic levels specified in the 2012 IECC Residential Energy Efficiency.

Our amendments merely allow exchanging one BTU saved for another and thus result in energy neutral outcomes which do not "weaken energy conservation and efficiency provisions contained in the 2012 IECC."

The purpose of ***Amendment A*** is to allow equipment trade-off provisions for the heating systems, cooling systems, and service water heating in residential construction 3 stories and below as it already is allowed for those 4 stories or above.

One of the most practical, cost effective ways to conserve energy is to utilize high efficiency equipment. The 2012 IECC code does not provide any incentives for the builder to install high efficiency equipment, but

The feedback from builders knowledgeable about energy efficiency supports the view that the 2012 IECC is pushing or exceeding practical limits in nearly every aspect of the energy code. There are concerns about liability from a house that is too tight and that has indoor air quality issues.

While the 2012 IECC is driving, in a positive way, major changes in how builders evaluate certain products and construction practices, there nonetheless are some changes that many builders, with seemingly sound justification, are reluctant to make (e.g. adding continuous exterior foam insulation, consistently achieving extremely tight envelopes). In addressing such concerns, high efficiency equipment trade-offs are necessary to provide builders the ability to manage potential liabilities since additional time and experience may end up demonstrating that liability concerns are well founded and that alternative approaches to increasing energy efficiency are warranted.

We want to prevent indoor air quality issues caused by "building too tightly" from becoming the energy equivalent of the Exterior Insulation and Finish System issues of the early 2000s or the Fire Retardant Plywood issues of the early 1990s.

This leads us to support code ***Amendment B***: Allow for energy neutral performance trade-offs for air leakage rates exceeding those specified in the 2012 IECC Residential Energy Efficiency.

Our amendment offers the ability to trade off building tightness in the performance path against other building requirements resulting in a home with equivalent energy performance.

A requirement for home air tightness of 3 Air Changes per Hour or less at a 50 Pascal pressure is extremely aggressive. A 1998 study by Lawrence Berkeley National Labs (Sherman and Dickerhoff) shows that only about 7% of the homes in the U.S. are at that level of tightness or tighter.

Meeting this requirement is challenging in nearly all circumstances; however, it is even more difficult in smaller homes which are built on slabs or crawl spaces. Moreover, the test for air tightness cannot be performed until the house is at or near completion, thereby limiting the ability to correct most leaks after testing.

Achieving air tightness is not an exact science. In order to meet a target requirement for air leakage rate of either 3 ACH50 (2012 IECC) or 7 ACH50 (2009 IECC) in climate zone 4, a builder will aim for an ACH50 that is lower by 2. The builder does this to meet the requirement, since the air tightness is controlled by too many variables.

Amendment A

Recommended State & Local Amendments to the 2012 International Energy Conservation Code (IECC)

Issue: The Elimination of Equipment Trade-offs

2012 IECC Section: Table R405.5.2(1)

Recommended Amendment:
Modify the Table as shown below (Delete text, add New Text)

TABLE R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Heating systems [f, g]	~~As proposed for other than electric heating without a heat pump, Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air-source heat pump meeting the requirements of Section R403 of the IECC-Commercial Provisions.~~ Fuel type: same as proposed design Efficiencies: Electric: air-source heat pump with prevailing federal minimum efficiency Nonelectric furnaces: natural gas furnace with prevailing federal minimum efficiency Nonelectric boilers: natural gas boiler with prevailing federal minimum efficiency Capacity: sized in accordance with Section R403.6	As proposed
Cooling system [f, h]	~~As proposed~~ Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards Capacity: sized in accordance with Section R403.6	As proposed
Service Water Heating [f, g, h, i]	~~As proposed~~ Fuel type: same as proposed design Efficiency: in accordance with prevailing Federal minimum standards Use: gal/day = 30 + 10 × *Nbr* Tank temperature: 120°F ~~Use: same as proposed design~~	As proposed Same as standard reference ~~gal/day = 30 + (10 × N_{br})~~

(Remainder of Table remains unchanged)

Reason:
The purpose of this amendment is to retain the original equipment trade-off provisions from the 2006 International Energy Conservation Code (IECC) for the heating systems, cooling systems, and service water heating.

Amendment B

Recommended State & Local Amendments to the 2012 International Energy Conservation Code (IECC)

Issue: **Dwelling Unit Air Leakage**

2012 IECC Section: **R402.4.1.2**

Recommended Amendment: Add Exception

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

Exception: When using the Simulated Performance Alternative (Section R405), an air leakage rate of up to a maximum of 7 air changes per hour at 50 Pascals in lieu of the mandatory 3 air changes per hour at 50 Pascals shall be allowed when equivalent or greater energy efficiency trade-offs are provided to offset the additional air leakage in excess of 5 air changes per hour at 50 Pascals in Climate Zones 1 and 2 and 3 air changes per hour at 50 Pascals in Climate Zones 3 through 8.

During testing:
1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;

Reason: A requirement for a home air tightness requirement of 3 Air Changes per Hour or less at a 50 Pascal pressure is extremely aggressive. A 1998 study by Lawrence Berkeley National Labs (Sherman and Dickerhoff) shows that only about 7% of the homes in the U.S. are at that level of tightness or tighter. This change offers the ability to trade-off building tightness in the performance path against other building requirements resulting in a home with equivalent energy performance.

Meeting this requirement is challenging in nearly all circumstances; however, it is even more difficult in smaller homes which are build on slabs or crawl spaces. Moreover, this test cannot be performed until the house is at or near completion, thereby limiting the ability to correct most leaks after testing.

4.19.12 CORRECTED

MARYLAND-NATIONAL CAPITAL BUILDING INDUSTRY ASSOCIATION
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MARYLAND-NATIONAL CAPITAL BUILDING INDUSTRY ASSOCIATION
TESTIMONY ON
MONTGOMERY COUNTY ADOPTION OF THE 2012 IBC, IRC, IECC, IMC and IFGC WITH AMENDMENTS
PUBLIC HEARING
6:00 PM, WEDNESDAY, APRIL 18, 2012
255 Rockville Pike, 2nd Floor, Seneca Conference Room
Rockville, Maryland 20850

My name is Randy Melvin. I am the Chairman of the Codes & Standards Committee of the Maryland-National Capital Building Industry Association, and Director of Research and Standards at Winchester Homes in Bethesda.

We appreciate this opportunity for comment on the County's adoption of the I-Codes with amendments. This is an important process to remedy major shortcomings of the "model codes."

The Codes & Standards Committee has reviewed the County's proposed amendments to the 2012 International Construction Codes as announced in the Montgomery County Register of April 1, 2012. Based on our review, the Association is here today to support, in principle, Executive Regulation No. 8-12 with the following comments and recommendations that need your consideration and adoption in order to correct inconsistences or problems noted and carried over from the 2009 code, and allow choices in approaches and techniques while meeting or exceeding the 2012 energy efficiency requirements. These changes make sense, are consistent with sound science and will result in flexibility leading to cost savings for the builder and consumer.

I am submitting this written testimony for the hearing record to provide more detail to my comments today. If we have additional supporting information, we will send a follow-up letter by the April 30, 2012 deadline for comments.

Adopt Energy Neutral Amendments. There is evidence that the ICC Final Action (Charlotte, NC, October 25-30, 2010) results for energy code were undermined and the outcome biased with respect to specific products and the placement of limits on choices [Appendix A]. There is no reason to discriminate against any specific means or materials available for saving energy. In fact, the International Energy Conservation Code is intended to allow *flexibility* and *choices* in achieving energy efficiency. Several code sections support flexibility and choice in achieving energy efficiency). For example, **R101.3 (N1101.2) Intent** states that "[t]his code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances."

Meeting this requirement is challenging in nearly all circumstances; however, it is even more difficult in smaller homes which are built on slabs or crawl spaces. Moreover, this test cannot be performed until the house is at or near completion, thereby limiting the ability to correct most leaks after testing. We also note the concerns about indoor air quality overtime when such a tight house is built.

Modeling calculations submitted to the Montgomery County DPS for our Equipment Trade- off Amendment and the Dwelling Air Leakage Amendments prove that these amendments are energy neutral.

A just released study [Appendix D] from the NAHB Research Center provides energy simulation results for the 2009 and 2012 IECC. The study determined cost savings of more than $1,600 for building an equally energy efficient house using the 2012 IECC when flexibility is allowed for trade-offs that included air tightness and insulation and a higher efficiency furnace.

Prescriptive Potable Pipe Water Insulation

There are limited water savings and high costs associated with the pipe insulation required by **2012 IECC R403.4.2 and IRC N1103.4.2** as shown by information from both EPA WaterSense Program and a NAHB Research Center study. We therefore proposed an exception to the code as shown [Amendment C] that provides the choice of using a simpler means of saving at least an equivalent amount of energy and thus will not detour builders from using the prescriptive compliance path for this code.

EPA evaluated this requirement and eliminated it from its final WaterSense program [Appendix B]. A December 2010 study entitled "Domestic Hot Water System Piping Analysis of Benefits and Cost" [Appendix C] was prepared for the National Association of Home Builders by the NAHB Research Center and supports the EPA conclusion that there are limited water savings and high costs associated with pipe insulation. "When a full hot water system is simulated in a single-family house using standard hot water use profiles with varying flow rates, time between draws, and pipe lengths from the hot water heater to the outlet, the study showed that the benefit of pipe insulation is much less significant and the cost benefit to using pipe insulation is on the order of approximately $3 to $11 per year depending on the fuel rates, resulting in simple paybacks of 60 to 100 years based on a range of installed insulation costs. In addition, it is very difficult to measure, to install or inspect such insulation and this requirement will detour builders from using the simple streamlined prescriptive compliance approach allowed by the code."

The Association also proposes several **amendments to the IRC, IBC and IMC** that make sense and are based on sound reasoning.

Make up Air Requirement for Domestic Kitchen Exhaust

The Building Industry is proposing amendments to **2012 IRC M1503.4 and 2012 IMC 505.2** [Amendment D] in order to reduce bringing in an excessive amount of unnecessary air into the home. As currently written, the code requires all the

companies and would have to purchase both the 2012 IRC and IECC. This is inefficient and an unnecessary waste of both human and natural resources.

We therefore recommend that Montgomery County retain Chapter 11 of the 2012 IRC.

The Association hopes that you will adopt the offered amendments that will lead to smarter, more flexible and safer code. Allowing choices among all the techniques and approaches available will reduce construction costs, leading to more affordable housing.

Extensive education and training is needed before the 2012 I-Codes are used and enforced. With the financial climate still in flux, there are many projects in the design pipeline that have not been finalized. Having to redesign these projects to the 2012 I-Codes could result in loss of financial backing or abandonment of the project. Therefore we request that the transition or phase-in period be six months from the signing date or effective date of this regulation.

The Building Industry looks forward to continuing to work constructively with the Department of Permitting Services. Additional information and comments may be provided by the April 30th deadline.

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We appreciate this opportunity for comment on the County's adoption of the I-Codes with amendments. This is an important process to remedy major shortcomings of the "model codes."

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I am submitting this written testimony for the hearing record to provide more detail to my comments today. If we have additional supporting information, we will send a follow-up letter by the April 30, 2012 deadline for comments.

Adopt Energy Neutral Amendments. There is evidence that the ICC Final Action (Charlotte, NC, October 25-30, 2010) results for energy code were undermined and the outcome biased with respect to specific products and the placement of limits on choices [Appendix A]. There is no reason to discriminate against any specific means or materials available for saving energy. In fact, the International Energy Conservation Code is intended to allow *flexibility* and *choices* in achieving energy efficiency. Several code sections support flexibility and choice in achieving energy efficiency). For example, **R101.3 (N1101.2) Intent** states that "[t]his code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances."

In addition, we note that many choices in the 2012 IECC provide limited energy savings or have excessively long payback periods. Other choices should be provided to achieve the energy savings in a reasonable timeframe.

We therefore propose the following *energy neutral code amendments* to restore cost effective choices for constructing energy efficient homes.

Equipment Trade-offs

The Association proposes that the County adopt an amendment to the IECC to allow more energy efficient equipment trade-offs with a minimum energy requirement being met or exceeded, as determined by the Performance Method. This amendment would be energy neutral.

Whether energy is saved through an improved energy envelope in the home or the more efficient combustion of fuel by the HVAC or water heating equipment or a combination of the two is irrelevant as long as the same amount of energy is saved. Not allowing builders to receive credit for putting more energy efficient equipment in new homes is analogous to telling auto manufactures that they can count the improved gas mileage benefits of the lighter weight or more aerodynamic aspects of the car but NOT COUNT the benefits of the more efficient engine! The Building Industry's recommended code amendments to **IECC Table R405.5.2(1) and IRC Chapter 11, Table N1105.5.2(1)** are provided as Amendment A.

Without this amendment, the use of higher efficiency equipment will be discouraged and a source for energy conservation and construction cost savings eliminated.

Dwelling Unit Air Leakage

2012 IECC R402.4.1.2 and 2012 IRC N1102.4.1.2 requires 3 air changes per hour in Climate Zones 3 through 8. It should be noted that it will be difficult for both Multifamily and Single Family Builders to achieve this result. When a blower door test indicates that this result has not been achieved, there are no easy remedies. Therefore, the Building Industry is proposing an amendment to **2012 IECC R402.4.1.2 and to 2012 IRC N1102.4.1.2** to provide an energy neutral exception to overly stringent air leakage requirements when the Simulated Performance Alternative (Sections R405 and N1105) is utilized [Amendment B]. The exception provides an avenue to find equivalent energy savings elsewhere at reduced cost and complexity.

A requirement for a home air tightness requirement of 3 air changes per hour or less at a 50 Pascal pressure is extremely aggressive. A 1998 study by Lawrence Berkeley National Labs (Sherman and Dickerhoff) shows that only about 7% of the homes in the U.S. are at that level of tightness or tighter. The code change proposed offers the ability to trade off building tightness in the performance path against other building requirements resulting in a home with equivalent or better energy performance.

Meeting this requirement is challenging in nearly all circumstances; however, it is even more difficult in smaller homes which are built on slabs or crawl spaces. Moreover, this test cannot be performed until the house is at or near completion, thereby limiting the ability to correct most leaks after testing. We also note the concerns about indoor air quality overtime when such a tight house is built.

Modeling calculations submitted to the Montgomery County DPS for our Equipment Trade- off Amendment and the Dwelling Air Leakage Amendments prove that these amendments are energy neutral.

A just released study [Appendix D] from the NAHB Research Center provides energy simulation results for the 2009 and 2012 IECC. The study determined cost savings of more than $1,600 for building an equally energy efficient house using the 2012 IECC when flexibility is allowed for trade-offs that included reduced air changes and insulation and a higher efficiency furnace.

Prescriptive Potable Pipe Water Insulation

There are limited water savings and high costs associated with the pipe insulation required by **2012 IECC R403.4.2 and IRC N1103.4.2** as shown by information from both EPA WaterSense Program and a NAHB Research Center study. We therefore proposed an exception to the code as shown [Amendment C] that provides the choice of using a simpler means of saving at least an equivalent amount of energy and thus will not detour builders from using the prescriptive compliance path for this code.

EPA evaluated this requirement and eliminated it from its final WaterSense program [Appendix B]. A December 2010 study entitled "Domestic Hot Water System Piping Analysis of Benefits and Cost" [Appendix C] was prepared for the National Association of Home Builders by the NAHB Research Center and supports the EPA conclusion that there are limited water savings and high costs associated with pipe insulation. "When a full hot water system is simulated in a single-family house using standard hot water use profiles with varying flow rates, time between draws, and pipe lengths from the hot water heater to the outlet, the study showed that the benefit of pipe insulation is much less significant and the cost benefit to using pipe insulation is on the order of approximately $3 to $11 per year depending on the fuel rates, resulting in simple paybacks of 60 to 100 years based on a range of installed insulation costs. In addition, it is very difficult to measure, to install or inspect such insulation and this requirement will detour builders from using the simple streamlined prescriptive compliance approach allowed by the code."

The Association also proposes several **amendments to the IRC, IBC and IMC** that make sense and are based on sound reasoning.

Make up Air Requirement for Domestic Kitchen Exhaust

The Building Industry is proposing amendments to **2012 IRC M1503.4 and 2012 IMC 505.2** [Amendment D] in order to reduce bringing in an excessive amount of unnecessary air into the home. As currently written, the code requires <u>all</u> the

exhaust air to be replaced if the range hood exhausts in excess of the rate of 400 cubic feet per minute. The 400-cfm figure is arbitrary. It was selected in the 2009 code cycle based on the hood systems on the market as "a reasonable threshold to start at" [Ref: ICC Sept. 2006 M65-06/07]. The code section as written does not take down-draft systems, popular with homeowners, into consideration. Most of them operate at 500 to 600 cfm and therefore require makeup air.

Our amendment as proposed would require only the exhaust air in excess of the rate of 400 cubic feet per minute to be replaced. Essentially, there would be no difference between the effect a 400 cfm fan has on a house and a 600 cfm fan with 200 cfm of makeup air. This would also improve the feasibility and acceptance of this code section as well as cut down on the amount of wasted energy in heating or cooling the makeup air.

Window Sill Height

In Montgomery County's 2012 proposal Sec. 58, IBC 1013.8 is amended to provide an exception that allows buildings with four stories or less to have the window sill height at not less than 18 inches above the finished floor surface in the room.

There is no reason not to use 18 inches above the finished floor surface of the room as the window sill height for all residential, whether below or above four stories. We note that the 2009 IRC was so amended in the Montgomery County Code (Section 139), and believe that the County intended to have such as amendment for the 2012 IRC.

From a safety viewpoint, education has been determined to be the best deterrent since with higher sill heights, there is the potential for the occupant to place furniture or other objects under the window that a child could climb upon. In fact in Denver, Colorado, one of the few areas in the country that has had a minimum sill height requirement for the past decade, the number of child injuries and deaths were increasing.

Therefore we propose amendments to **IBC 1013.8** [Amendment E] and to **IRC R312.2.1** [Amendment F] to require the same window sill height for all residential.

IRC Chapter 11 [RE] - Energy Efficiency

There is no reason for Montgomery County to delete Chapter 11 [RE] - Energy Efficiency of the 2012 IRC as proposed in MCER 8-12, Section 157.

In its Final Action, the State retained Chapter 11 of the IRC saying in the November 18, 2011 Maryland Register that "[i]t is unnecessary to delete Chapter 11 of the International Residential Code because the requirements of Chapter 11 are the same as the requirements in the International Energy Conservation Code, which is also incorporated by reference. Retaining Chapter 11 does not change any code requirement." Further, deletion of the energy section of the IRC, Chapter 11, is detrimental to the majority of builders in Maryland, since they are small building

companies and would have to purchase both the 2012 IRC and IECC. This is inefficient and an unnecessary waste of both human and natural resources.

We therefore recommend that Montgomery County retain Chapter 11 of the 2012 IRC.

The Association hopes that you will adopt the offered amendments that will lead to smarter, more flexible and safer code. Allowing choices among all the techniques and approaches available will reduce construction costs, leading to more affordable housing.

Extensive education and training is needed before the 2012 I-Codes are used and enforced. With the financial climate still in flux, there are many projects in the design pipeline that have not been finalized. Having to redesign these projects to the 2012 I-Codes could result in loss of financial backing or abandonment of the project. Therefore we request that the transition or phase-in period be six months from the signing date or effective date of this regulation.

The Building Industry looks forward to continuing to work constructively with the Department of Permitting Services. Additional information and comments may be provided by the April 30th deadline.

Amendment A

Recommended State & Local Amendments to the 2012 International Energy Conservation Code (IECC)

Issue: The Elimination of Equipment Trade-offs

2012 IECC Section: Table R405.5.2(1)

Recommended Amendment:
Modify the Table as shown below (Delete text, add New Text)

TABLE R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Heating systems [f, g,]	~~As proposed for other than electric heating without a heat pump, Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section R403 of the IECC Commercial Provisions.~~ Fuel type: same as proposed design Efficiencies: Electric: air-source heat pump with prevailing federal minimum efficiency Nonelectric furnaces: natural gas furnace with prevailing federal minimum efficiency Nonelectric boilers: natural gas boiler with prevailing federal minimum efficiency Capacity: sized in accordance with Section R403.6	As proposed
Cooling system [f, h]	~~As proposed~~ Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards Capacity: sized in accordance with Section R403.6	As proposed
Service Water Heating [f, g, h, i]	~~As proposed~~ Fuel type: same as proposed design Efficiency: in accordance with prevailing Federal minimum standards Use: gal/day = 30 + 10 × *Nbr* Tank temperature: 120°F ~~Use: same as proposed design~~	As proposed Same as standard reference ~~gal/day = 30 + (10 × N_{br})~~

(Remainder of Table remains unchanged)

Reason:
The purpose of this amendment is to retain the original equipment trade-off provisions from the 2006 International Energy Conservation Code (IECC) for the heating systems, cooling systems, and service water heating.

By retaining these, builders have an opportunity to optimize a code-compliant house design by using energy efficient equipment.

Eliminating the ability to use equipment efficiency as a means to achieve whole-house energy conservation will discourage the use of higher efficiency equipment. Quite often, the use of this high efficiency equipment provides a more cost effective solution to achieve code compliance. Eliminating this ability discourages the concept of the "house as a system" approach which is a cornerstone of many state energy programs and the Federal Energy Star Program. In fact, without this amendment the current practice for constructing an Energy Star home in this jurisdiction would be disallowed.

Without accepting this amendment will force a negative impact on the installation of state-of-the-art, more energy efficient equipment, it will increase the cost of construction by driving builders to often use less efficient equipment while dramatically increasing the cost of construction of the building envelope, namely windows and fiberglass insulation.

Significant improvements in the efficiency of HVAC and water heating equipment have been made in the last 20 years. With the increased emphasis on new and improved technologies, this trend will continue and will result in even higher energy savings in future years. Eliminating the ability to recognize the value of these technologies in the marketplace will prove detrimental to all builders and ultimately the homeowners.

One of the easiest ways to conserve energy is to utilize high efficiency equipment. The 2012 IECC code does not provide any incentives for the builder to install high efficiency equipment, but rather continues the use of the minimum equipment efficiencies established by federal standards.

The language in the 2012 IECC effectively removes the use of high efficiency HVAC equipment as a reasonable and cost-effective solution to achieve compliance. Failure to remove the existing language concentrates solely on the building envelope by focusing on insulation/windows to meet specific energy targets.

For these reasons we encourage the adoption of this amendment.

Amendment A

Recommended State & Local Amendments to the 2012 International Residential Code (IRC)

Issue: The Elimination of Equipment Trade-offs

2012 IRC Section: Chapter 11, Table N1105.5.2(1)

Recommended Amendment:
Modify the Table as shown below (Delete text, add New Text)

TABLE N1105.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Heating systems [f, g]	~~As proposed for other than electric heating without a heat pump, Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section R403 of the IECC-Commercial Provisions.~~ Fuel type: same as proposed design Efficiencies: Electric: air-source heat pump with prevailing federal minimum efficiency Nonelectric furnaces: natural gas furnace with prevailing federal minimum efficiency Nonelectric boilers: natural gas boiler with prevailing federal minimum efficiency Capacity: sized in accordance with Section N1103.6	As proposed
Cooling system [f, h]	~~As proposed~~ Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards Capacity: sized in accordance with Section N1103.6	As proposed
Service Water Heating [f, g, h, i]	~~As proposed~~ Fuel type: same as proposed design Efficiency: in accordance with prevailing Federal minimum standards Use: gal/day = 30 + 10 × *Nbr* Tank temperature: 120°F ~~Use: same as proposed design~~	As proposed Same as standard reference ~~gal/day = 30 + (10 × N_{br})~~

(Remainder of Table remains unchanged)

Reason:
The purpose of this amendment is to retain the original equipment trade-off provisions from the 2006 International Residential Code (IRC) Chapter 11 for the heating systems, cooling systems, and service water heating.

By retaining these, builders have an opportunity to optimize a code-compliant house design by using energy efficient equipment.

Eliminating the ability to use equipment efficiency as a means to achieve whole-house energy conservation will discourage the use of higher efficiency equipment. Quite often, the use of this high efficiency equipment provides a more cost effective solution to achieve code compliance. Eliminating this ability discourages the concept of the "house as a system" approach which is a cornerstone of many state energy programs and the Federal Energy Star Program. In fact, without this amendment the current practice for constructing an Energy Star home in this jurisdiction would be disallowed.

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One of the easiest ways to conserve energy is to utilize high efficiency equipment. The 2012 IRC Chapter 11 code does not provide any incentives for the builder to install high efficiency equipment, but rather continues the use of the minimum equipment efficiencies established by federal standards.

The language in the 2012 IRC Chapter 11 effectively removes the use of high efficiency HVAC equipment as a reasonable and cost-effective solution to achieve compliance. Failure to remove the existing language concentrates solely on the building envelope by focusing on insulation/windows to meet specific energy targets.

For these reasons we encourage the adoption of this amendment.

Amendment B

Recommended State & Local Amendments to the 2012 International Energy Conservation Code (IECC)

Issue: **Dwelling Unit Air Leakage**

2012 IECC Section: **R402.4.1.2**

Recommended Amendment: Add Exception

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

Exception: When using the Simulated Performance Alternative (Section R405), an air leakage rate of up to a maximum of 7 air changes per hour at 50 Pascals in lieu of the mandatory 3 air changes per hour at 50 Pascals shall be allowed when equivalent or greater energy efficiency trade-offs are provided to offset the additional air leakage in excess of 5 air changes per hour at 50 Pascals in Climate Zones 1 and 2 and 3 air changes per hour at 50 Pascals in Climate Zones 3 through 8.

During testing:
1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;

Reason: A requirement for a home air tightness requirement of 3 Air Changes per Hour or less at a 50 Pascal pressure is extremely aggressive. A 1998 study by Lawrence Berkeley National Labs (Sherman and Dickerhoff) shows that only about 7% of the homes in the U.S. are at that level of tightness or tighter. This change offers the ability to trade-off building tightness in the performance path against other building requirements resulting in a home with equivalent energy performance.

Meeting this requirement is challenging in nearly all circumstances; however, it is even more difficult in smaller homes which are build on slabs or crawl spaces. Moreover, this test cannot be performed until the house is at or near completion, thereby limiting the ability to correct most leaks after testing.

Amendment B

Recommended State & Local Amendments to the 2012 International Residential Code (IRC)

Issue: **Dwelling Unit Air Leakage**

2012 IRC Section: **N1102.4.1.2**

Recommended Amendment: Add Exception

NI102.4.1.2 (R402.4.1.2) Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour in Zones 1 and 2, and 3 air changes per hour in Zones 3 through 8. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *building official,* testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *building official.* Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope.*

Exception: When using the Simulated Performance Alternative (Section N1105), an air leakage rate of up to a maximum of 7 air changes per hour at 50 Pascals in lieu of the mandatory 3 air changes per hour at 50 Pascals shall be allowed when equivalent or greater energy efficiency trade-offs are provided to offset the additional air leakage in excess of 5 air changes per hour at 50 Pascals in Climate Zones 1 and 2, and 3 air changes per hour at 50 Pascals in Climate Zones 3 through 8.

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Amendment C

Recommended State & Local Amendments to the 2012 International Energy Conservation Code (IECC)

Issue: Hot Water Pipe Insulation

2012 IECC Section Number: R403.4.2

Recommended Amendment:
Modify as shown (Add Exception):

R403.4.2 Hot water pipe insulation (Prescriptive).
Insulation for hot water pipe with a minimum thermal resistance (*R*-value) of R-3 shall be applied to the following:

1. Piping larger than $^3/_4$ inch nominal diameter.
2. Piping serving more than one dwelling unit.
3. Piping from the water heater to kitchen outlets.
4. Piping located outside the conditioned space.
5. Piping from the water heater to a distribution manifold.
6. Piping located under a floor slab.
7. Buried piping.
8. Supply and return piping in recirculation systems other than demand recirculation systems.
9. Piping with run lengths greater than the maximum run lengths for the nominal pipe diameter given in Table R403.4.2.

All remaining piping shall be insulated to at least R-3 or meet the run length requirements of Table R403.4.2.

TABLE R403.4.2 MAXIMUM RUN LENGTH (feet)[a]

Nominal Pipe Diameter of Largest Diameter Pipe in the Run (inch)	$^3/_8$	$^1/_2$	$^3/_4$	> $^3/_4$
Maximum Run Length	30	20	10	5

For SI: 1 inch = 25.4 mm, 1 foot 304.8 mm.

a. Total length of all piping from the distribution manifold or the recirculation loop to a point of use.

Exception: Insulating hot water pipe is not required when one of the following off - setting energy savings alternatives is instituted.

Increase any one of the prescriptive; ceiling, wood frame wall, mass wall, floor, basement wall, slab, or crawlspace insulation R-value requirements, as per Table R402.1.1, by R-1.

Reason:
It is very difficult to measure, install and inspect hot water pipe insulation and thus this requirement will detour builders from using the simple, streamlined, prescriptive, compliance approach allowed by this code. In addition, Hot Water Pipe Insulation saves only negligible amounts of energy and is not cost effective. EPA evaluated this requirement and eliminated it from its final WaterSense program [BIA Sept 30, 2011 Testimony, Appendix E]. A December 2010 study entitled "Domestic Hot Water System Piping Analysis of Benefits and Cost" [BIA Sept 30, 2011 Testimony, Appendix F], prepared for the National Association of Home Builders by the NAHB Research Center, supports the EPA conclusion that there are limited water savings and high costs associated with pipe insulation. "When a full hot water system is simulated in a single-family house using standard hot water use profiles with varying flow rates, time between draws, and pipe lengths from the hot water heater to the outlet, the study showed that the benefit of pipe insulation is much less significant and the cost benefit to using pipe insulation is on the order of approximately $3 to $11 per year depending on the fuel rates, resulting in simple paybacks of 60 to 100 years based on a range of installed insulation costs.

The proposed exception/alternative provides the choice of using a simpler, means of saving at least an equivalent amount of energy and thus will not detour builders from using the prescriptive compliance path for this code.

Amendment C

Recommended State & Local Amendments to the 2012 International Residential Code (IRC)

Issue: Hot Water Pipe Insulation

2012 IRC Section Number: N1103.4.2 (R403.4.2)

Recommended Amendment:
Modify as shown (Add Exception):

N1103.4.2 (R403.4.2) Hot water pipe insulation (Prescriptive).
Insulation for hot water pipe with a minimum thermal resistance (*R*-value) of R-3 shall be applied to the following:

1. Piping larger than $^3/_4$ inch nominal diameter.
2. Piping serving more than one dwelling unit.
3. Piping from the water heater to kitchen outlets.
4. Piping located outside the conditioned space.
5. Piping from the water heater to a distribution manifold.
6. Piping located under a floor slab.
7. Buried piping.
8. Supply and return piping in recirculation systems other than demand recirculation systems.
9. Piping with run lengths greater than the maximum run lengths for the nominal pipe diameter given in Table R403.4.2.

All remaining piping shall be insulated to at least R-3 or meet the run length requirements of Table R403.4.2.

TABLE N1103.4.2 (R403.4.2) MAXIMUM RUN LENGTH (feet)[a]

Nominal Pipe Diameter of Largest Diameter Pipe in the Run (inch)	$^3/_8$	$^1/_2$	$^3/_4$	$>^3/_4$
Maximum Run Length	30	20	10	5

For SI: 1 inch = 25.4 mm, 1 foot 304.8 mm.

a. Total length of all piping from the distribution manifold or the recirculation loop to a point of use.

Exception: Insulating hot water pipe is not required when one of the following off-setting energy savings alternatives is instituted.

Increase any one of the prescriptive; ceiling, wood frame wall, mass wall, floor, basement wall, slab, or crawlspace insulation R-value requirements, as per Table N1102.1.1 (R402.1.1), by R-1.

Reason:
It is very difficult to measure, install and inspect hot water pipe insulation and thus this requirement will detour builders from using the simple, streamlined, prescriptive, compliance approach allowed by this code. In addition, Hot Water Pipe Insulation saves only negligible amounts of energy and is not cost effective. EPA evaluated this requirement and eliminated it from its final WaterSense program [BIA Sept 30, 2011 Testimony, Appendix E]. A December 2010 study entitled "Domestic Hot Water System Piping Analysis of Benefits and Cost" [BIA Sept 30, 2011 Testimony, Appendix F], prepared for the National Association of Home Builders by the NAHB Research Center, supports the EPA conclusion that there are limited water savings and high costs associated with pipe insulation. "When a full hot water system is simulated in a single-family house using standard hot water use profiles with varying flow rates, time between draws, and pipe lengths from the hot water heater to the outlet, the study showed that the benefit of pipe insulation is much less significant and the cost benefit to using pipe insulation is on the order of approximately $3 to $11 per year depending on the fuel rates, resulting in simple paybacks of 60 to 100 years based on a range of installed insulation costs.

The proposed exception/alternative provides the choice of using a simpler, means of saving at least an equivalent amount of energy and thus will not detour builders from using the prescriptive compliance path for this code.

Amendment D

Recommended State & Local Amendments to the 2012 Edition of the International Mechanical Code (IMC)

Issue: Domestic Kitchen Exhaust Makeup Air

2012 IMC Section Number: 505.2 Makeup Air Required

Recommended Amendment:
Modify the section as shown below:

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m3/s) shall be provided with makeup air at a rate approximately equal to the difference between the exhaust air rate and 400 cubic feet per minute. Such makeup air systems shall be equipped with a means of closure ~~and shall be automatically controlled to start and operate simultaneously with the exhaust system~~.

Exception: Where all appliances in the house are of sealed combustion, power-vent, unvented, or electric, the exhaust hood system shall be permitted to exhaust up to 600 cubic feet per minute (0.28 m3/s) without providing makeup air. Exhaust hood systems capable of exhausting in excess of 600 cubic feet per minute (0.28 m3/s) shall be provided with a makeup air at a rate approximately equal to the difference between the exhaust air rate and 600 cubic feet per minute.

Reason:
This section, new in the 2009 International Residential Code (IRC) and 2009 International Mechanical Code (IMC), attempts to solve an unproven backdrafting problem with range hoods. The exhaust rate of 400 cubic feet per minute (cfm) was chosen arbitrarily and without substantiation other than it being greater than the minimum exhaust rate of range hoods on the market. However, several manufacturers do not produce any range hoods below the 400 cfm threshold, effectively reducing a homeowner's choice of kitchen exhaust options without the added difficulty and expense of installing makeup air.

The reasoning that kitchen exhaust systems are available with an exhaust rate under 400 cfm does not take down-draft systems, popular with homeowners, into consideration. Most of them operate at 500 to 600 cfm and therefore require makeup air.

As written, this section allows range hoods up to 400 cfm to be installed without makeup air. It would be consistent to require makeup air equaling the amount above and beyond 400 cfm for larger fans. Essentially, there would be no difference between the effect a 400 cfm fan has on a house and a 600 cfm fan with 200 cfm of makeup air. This would also improve the feasibility and acceptance of this code section as well as cut down on the amount of wasted energy in heating or cooling the makeup air.

This section requires an automatic means of closure for the makeup air opening beyond what the code has historically required for residential construction. For example, Section G2407.6 requires no dampers whatsoever for combustion air openings to the outdoors, such as found in many homes in the northern U.S. The amended section would allow barometric dampers.

Finally, the current code section does not take into effect the fact that in many homes there is no danger of backdrafting, due to the lack of natural draft appliances. The 400 cfm threshold could be raised to 600 cfm in those cases with no added danger. This would allow for down-draft fans without dedicated makeup air.

Amendment D

Recommended State & Local Amendments to the 2012 Edition of the International Residential Code (IRC)

Issue: Range Hood Makeup Air

2012 IRC Section Number: M1503.4 Makeup Air Required

Recommended Amendment:
Modify the section as shown below:

M1503.4 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m3/s) shall be provided with makeup air at a rate approximately equal to the difference between the exhaust air rate and 400 cubic feet per minute. Such makeup air systems shall be equipped with a means of closure ~~and shall be automatically controlled to start and operate simultaneously with the exhaust system~~.

> **Exception:** Where all appliances in the house are of sealed combustion, power-vent, unvented, or electric, the exhaust hood system shall be permitted to exhaust up to 600 cubic feet per minute (0.28 m3/s) without providing makeup air. Exhaust hood systems capable of exhausting in excess of 600 cubic feet per minute (0.28 m3/s) shall be provided with a makeup air at a rate approximately equal to the difference between the exhaust air rate and 600 cubic feet per minute.

Reason:
This section, new in the 2009 International Residential Code (IRC) and 2009 International Mechanical Code (IMC), attempts to solve an unproven backdrafting problem with range hoods. The exhaust rate of 400 cubic feet per minute (cfm) was chosen arbitrarily and without substantiation other than it being greater than the minimum exhaust rate of range hoods on the market. However, several manufacturers do not produce any range hoods below the 400 cfm threshold, effectively reducing a homeowner's choice of kitchen exhaust options without the added difficulty and expense of installing makeup air.

The reasoning that kitchen exhaust systems are available with an exhaust rate under 400 cfm does not take down-draft systems, popular with homeowners, into consideration. Most of them operate at 500 to 600 cfm and therefore require makeup air.

As written, this section allows range hoods up to 400 cfm to be installed without makeup air. It would be consistent to require makeup air equaling the amount above and beyond 400 cfm for larger fans. Essentially, there would be no difference between the effect a 400 cfm fan has on a house and a 600 cfm fan with 200 cfm of makeup air. This would also improve the feasibility and acceptance of this code section as well as cut down on the amount of wasted energy in heating or cooling the makeup air.

This section requires an automatic means of closure for the makeup air opening beyond what the code has historically required for residential construction. For example, Section G2407.6 requires no dampers whatsoever for combustion air openings to the outdoors, such as found in many homes in the northern US. The amended section would allow barometric dampers.

Finally, the current code section does not take into effect the fact that in many homes there is no danger of backdrafting, due to the lack of natural draft appliances. The 400 cfm threshold could be raised to 600 cfm in those cases with no added danger. This would allow for down-draft fans without dedicated makeup air.

Amendment E

Recommended State & Local Amendments to the 2012 International Building Code (IBC)

Issue: Window Sill Height

2012 IBC Section Number: 1013.8

Recommended Amendment:
Delete the portion of the code and replace as shown below:

1013.8 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than 18 inches (457mm) ~~36 inches (610 mm)~~ above the finished floor surface of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102mm) sphere where such openings are located within 18 inches (457mm) ~~36 inches (915mm)~~ of the finished floor
Remainder left unchanged

Reason:
~~The 2012 International Residential Code does not require window guards for windows with a sill height greater than 24 inches off of the finish floor.~~ The International Building Code requires the installation of windows guards on windows with a sill height less than 36 inches off of the finished floor. During the 2009-10 code development cycle, the IRC-BE committee disapproved a similar proposal to raise the window sill height to 36 inches and the committees decision was upheld at the final action hearing. A similar public comment to raise the window sill height to 36 inches also failed to pass the final assembly.

For the many years the debate for requiring fall protection devices the most contentious issue has been the height of the window sill in which the device should be required. The Building Industry agrees with many of the concerns that were raised by the opponents of the proposal. By raising the window sill height requirement to 36 inches there is the potential for unintended consequences as it may cause children to prop items or move furniture to allow them to see over the window sill which is no longer below their field of vision.

Many of the children safety advocates focus their efforts to relay safety messages to parents regarding the prevention of falls by recommending that windows should be closed in rooms where children are playing, where children are unsupervised, avoid placing furniture near windows and if windows are going to be left open, open them from the top down.

Board of Directors action in September 2010). This allowed proprietary interests to unfairly influence the outcome of the IECC Final Action Hearings; and

5) ICC's commitment to an unbiased, fair and open code development process was undermined by the proprietary or pecuniary interests of some designated Governmental Member Voting Representatives at the 2010 Final Action Hearings in Charlotte, NC, in violation of the principles outlined in CP #37-09 (Ethics) and now included in the ICC Statement of Ethical Conduct which replaced CP #37-09 by ICC Board of Directors action in September 2010: *"ICC members and member representatives should pursue fairness and objectivity in all activities" and "Governmental Member Voting Representatives are further directed to avoid participating or influencing ICC activities in which the member is financially interested" and "Promote transparency by disclosing potential conflicts of interest, or any matter which would reasonably create the appearance of a conflict of interest".*

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Appendix A

Appeal from the Final Action Hearings ("Final Action Hearings") regarding Proposed Changes to the 2009 International Energy Conservation Code ("IECC")

Thomas S. Zaremba, on behalf of Pilkington North America, Inc. ("PNA") and AGC Flat Glass North America, Inc. ("AGC") (collectively "Appellants") appeal the final actions taken on proposed changes to the 2009 IECC.

I. The issues:

The questions (issues) raised by this appeal are set out in a Consolidated Statement of Issues for Determination on Appeal.

II. The standard applicable to a determination of the questions raised in this appeal:

Pursuant to CP #1-03 Section 5.3.8, the standard applicable to a determination of the questions raised in this appeal is whether there was a material and significant irregularity of process or procedure in the IECC's Final Action Hearings?

III. Why these issues are being appealed:

These issues are being appealed because significant irregularities of process or procedure may have occurred at the IECC Final Action Hearings.

The Energy Efficient Codes Coalition ("EECC") has membership interests that are both proprietary and non-proprietary. EECC developed a detailed voting agenda (the "30% Solution 2012") for its members to follow at the Charlotte hearings. NASEO and ICLEI are both members of EECC and it is believed that some of their members were allowed to vote at the IECC Final Action Hearings. Did allowing members of EECC to vote allow proprietary interests of EECC members to influence the outcome of the IECC Final Action Hearings; or, did it create the appearance that the proprietary interests of EECC members influenced the outcome of the IECC Final Action Hearings? If so, did allowing EECC members to vote violate the International Code Development "Governmental Consensus" Process ("CDP") which requires Final Action Hearings to be "open, fair, objective, and allow no proprietary interests to influence their outcome"? Or, did allowing EECC members to vote undermine the requirements of the CDP by creating the appearance that they were violated?

It appears that some voters at the IECC Final Action Hearings were associated with State Energy Offices or other offices that have no responsibility for enforcing the code or public safety. This raises the question whether voters with no responsibility for enforcing the code or public safety were qualified or eligible to vote at the IECC Final Action Hearings?

Finally, it appears that some voters were recruited and provided travel reimbursements to attend and vote in favor of the 30% Solution 2012. This raises questions whether vote stacking occurred at the IECC Final Action Hearings and if so, whether it violated the CDP requirements

or whether it undermined the CDP requirements by creating the appearance that they were violated?

IV. Adverse affect on Appellants:

Appellants are both primary glass manufacturers and active participants in the ICC's CDP. As such, they are interested in its integrity. Even an appearance of irregularity or impropriety in voting at Final Action Hearings can materially and significantly undermine the integrity of the CDP which will adversely affect Appellants.

PNA and AGC are directly, materially and adversely affected by the process, procedures and outcome of the ICC's Final Action Hearings and the issues being appealed. In that regard, PNA manufactures glass at six (6) float lines in four (4) different plants throughout the United States. AGC manufactures glass at four (4) float lines in four (4) different plants throughout the United States. Each float line represents a capital investment of approximately $100,000,000 (or more) and employs between 200 and 300 people. Once a float line begins operation, its furnace must remain in operation, producing glass 24 hours a day, 7 days a week, 365 days a year over its useful life of approximately 15 years.

Appellants have invested hundreds of millions of dollars in their, respective, glass manufacturing facilities and have a significant investment and interest in the architectural glass market throughout the United States. In addition to employing hundreds of people throughout the country, Appellants also invest millions of dollars annually to research and develop different types of glass products for use in diverse building envelope applications.

Both the architectural glass market in which Appellants are involved and the diversity of glass products that Appellants have developed are directly affected by the IECC's Final Action Hearings and the issues being appealed.

As stakeholders and long time participants in the ICC's CDP, Appellants were adversely affected by the irregularities of process or procedure that occurred at the IECC Final Action Hearings.

V. Interested parties:

ICC has informed Appellants that it intends to notify interested parties of appeals of the IECC Final Action Hearings by giving notice and providing links to the appeals on ICC's website.

VI. The remedial actions requested:

1. Rescind actions taken at the IECC Final Action Hearings,

– or –

2. Reverse actions taken at the IECC Final Action Hearings as to EC13-PC10, EC34, EC35, EC41, EC42, EC97, EC141, EC165-PC5, and EC174.

3. Prohibit voters that are members of organizations having proprietary interests in the outcome of Final Action hearings from voting.

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Appendix A

3. Institute adequate safeguards to ensure that vote stacking is not permitted; that the CDP used at Final Action Hearings is open, fair, objective, and not influenced by propriety interests; and that only governmental officials who, in their positions of public trust, actually enforce the code and are charged with the public's safety, vote at Final Action Hearings.

Respectfully submitted,

/s/ Thomas S. Zaremba

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Toledo, Ohio 43604
Ph: 419.242.7985

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Appendix A

The 2012 IECC Hearings - 'Watt' just happened?

[http://www.examiner.com/green-building-in-seattle/the-2012-iecc-hearings-watt-just-happened]

By Kristyn Clayton, Examiner.com, November 1, 2010

The International Energy Conservation Code underwent revision in Charlotte, NC this past week. The voting body of government representatives passed a new energy code that significantly tightens the envelopes of buildings, raises the efficiency for mechanical equipment, and institutes testing and controls in homes and offices. The ICC will publish this in 2011/2012 for adoption. Please see www.Iccsafe.org for more information. WA State is currently set to adopt it in 2012. It apparently will raise the stringency of the 2009 IECC code by 25%. It also eliminates the old International Residential Code chapter 11 that contained prescriptive energy provisions. This would be controversial enough in the states that have adopted it and seek to enforce it. Yet the normal arguments that have plagued the WA energy code adoption may pale in comparison to the buzz that grew to a roar around the Crown Ballroom at the Charlotte Convention Center.

Rumor had it that DOE paid jurisdictions to send people to the hearings for "training" as part of the federal stimulus money allocation to assist states in energy code adoption and enforcement. Apparently, they were urged to join the ICC to become voting members, then given a sheet explaining the proposals and the recommended voting strategy to achieve their goals for a 30% increase in stringency over the 2009 code. In the past, the energy code voting process was attended by the people who write and defend the proposals and by about 100 voting members of the ICC at best. This time there were over 400 voters.

Due to the appearance of impropriety there should be an investigation of the ethics for using federal money to pay people to attend the hearings, join the ICC and then vote as they were directed.

Until then, it appears that the home-grown state energy code that is still being fought over and debated in Washington, will now take effect on January 1, 2011. Ironically and arguably, this code may or may not even meet the new IECC for stringency should it survive the slings and arrows of its enemies. In the opinion of one who was in Charlotte, the WSEC version is clearly not more stringent. http://www.energy.wsu.edu/apps/EnergyCode.aspx Imagine all of the computer energy that will be spent trying to investigate and defend that process if the outcome of those hearings results in appeals of the new codes due to ethics violations -not to mention the thousands of dollars spent to reconvene the hearing if necessary.

This is not the first time antics like these have plagued code hearings in the United States. Perhaps the bigger question is this: What has happened to the art of debate, where codes and laws are challenged in an intelligent, thoughtful and respectful way without dirty tricks interference? We should not allow this process to become what the political elections process has become – an unbearable, irrelevant, unintelligent and expensive waste of human energy and money. How did energy codes for buildings become so controversial that they are embroiled in ethics allegations? More on that later in another blog– The 2009 WA State Energy Code – Legal or Not? Until then - keep saving energy one watt at a time - it all adds up.

Kristyn Clayton is the owner of Green House Effects, a company that seeks to better the environment by offering practical sustainability consulting to interested and committed businesses and individuals. Her career work has been very diverse and includes commercial construction management, energy conservation advocacy and regulation, sustainability consulting and teaching in all of those subjects. She is a Washington State Building Code Council Member, appointed by the governor, representing commercial and industrial general contractors, responsible for oversight of the building codes and related policies of the state. As chair of the Energy Code Technical Advisory Group for the council she helps to guide the process of energy codes that have helped Washington be a leader in the world on efficient building construction. She has a B.S. in electrical engineering from the University of Virginia, and an M.S. in architecture from Washington State University.

Appendix A

INTERNATIONAL CODE COUNCIL

ICC Update for NAHB
"Building Codes –Future Strategies" Forum

The following is a summary of actions that the ICC Board of Directors have taken in our efforts to continually improve the ICC Code Development Process (CDP) and increase confidence in the results. These actions are a result of our collaboration with NAHB and our many other industry partners and reflect the input of our nearly 50,000 members.

Item	Action	Status
Tighten governmental member eligibility requirements to assure that only those involved in the health, safety and welfare of the built environment are authorized to vote	Based on recommendations from the ICC CDRAC Committee, the Board of Directors has submitted a bylaw amendment for the Members consideration in November. The Board believes that the code development process will be strengthened by refining the definition of Governmental Member and Governmental Member Voting Representative to focus on the "built environment". This proposal was supported by the Code Development Review Ad Hoc Committee, a Board appointed committee of board members and industry stakeholders which over a twelve month period thoroughly reviewed all aspects of the code development process. The Board encourages the Members to support this proposed amendment to help maintain the quality and credibility of the code development process.	✓
Modified the "Assemble Vote" at the initial action hearing	Based on recommendations from the ICC CDRAC Committee, the Board of Directors has modified CP 28 and modified the assemble vote at the initial action hearing.	✓
Residential Energy Code Development Process	A code change in the 2010 code development cycle put in question what ICC committee had responsibility for the development of residential energy requirements. In order to comply with ICC rules of procedure and existing agreements, the ICC Board approved the following new committee structure: Two committees have maintenance of ICC energy efficiency provisions as follows: 1. The current IECC Committee will be assigned responsibility for all energy efficiency provisions, except for residential buildings as defined below. 2. A new Residential Energy Committee will be established and assigned responsibility for all residential energy efficiency provisions. This new committee will contain representation from home builders, other industry groups, and code officials consistent with the existing agreements.	✓
Strengthen existing funding rules	Based on recommendations from the ICC CDRAC Committee, the ICC Board directed staff to develop language to amend ICC policies to prohibit private funding to designated Governmental Member Voting Representatives and require certification from Governmental Member jurisdictions to verify	✓
Policy on Local Amendments	ICC has agreed to reaffirm and communicate to ICC staff our policy on local amendments, which is:	

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Appendix A

	"The Code Council recognizes the sovereign right of some IAs to amend the ICodes. ICC respects the IAs desire to address specific geographic or climatic needs, for example. The ICC does not, as a matter of routine, take an active position in amendments to the I-Codes. During the adoption process, Code Council staff serves in a supporting role. Staff provides and assists IAs with rationale for existing code provisions, assists in identifying potential conflicts with correlation of regulations, assists with interpretations, code comparisons and supports technical committees chartered to review the I-Codes. The ICC may provide technical support on proposed amendments to the I-Codes when requested by the IA."	✓
New Cost Impact Criteria	The ICC Board has amend CP# 28, as follows: *"Sec. 3.3.5.6 Cost Impact: The proponent shall indicate one of the following regarding the cost impact of the code change proposal: 1) the code change proposal will increase the cost of construction; or 2) the code change proposal will not increase the cost of construction. The proponent should submit information that supports their claim. Any information submitted will be considered by the code development committee. This information will be included in the bibliography of the published code change proposal."*	✓
Remote Voting	Based on recommendations from the ICC CDRAC Committee, the Board of Directors set a strategic goal to provide for remote participation and tasked staff to present a work plan to the ICC Board of Directors in 2011 to implement changes to the code development process that utilize new and emerging technologies to increase member and stakeholder participation, consistent with ICC's mission. The work plan will provide for implementation of new processes by the start of the Code Development Cycle that will lead to the publication of the 2018 International Codes.	✓

Appendix B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
WATER

May 8, 2009

Dear Interested Party:

The U.S. Environmental Protection Agency (EPA) is pleased to announce the release of a revised draft specification for water-efficient single-family new homes. The purpose of this letter is to inform you of substantial changes made to the initial draft specification released in 2008, to share the rationale for making these changes, and to ask for your feedback.

Encouraging the construction of water-efficient new homes is the latest endeavor by EPA's voluntary WaterSense® program, launched in 2006 to protect the future of our nation's water supply by promoting water efficiency and enhancing the market for water-efficient products, services, and practices. WaterSense aims to change the way the American public and businesses think about their water use.

In May 2008, WaterSense released the draft specification for water-efficient single-family new homes for public comment and received substantial feedback. In the months since then, EPA has been taking steps to address stakeholder comments and provide additional resources to interpret the new homes specification. These tools include the following:

- Water budget tool: released in November 2008, which explains how builders shall comply with the draft specification's landscape design options;
- Inspection and irrigation audit guidelines: released in December 2008, which explain how the criteria outlined in the specification shall be verified and provides sample checklists for these tests; and
- New home certification system: released in December 2008, which explains the third party certification and labeling process for water-efficient single-family new homes. (Note: The certification system is in the process of being finalized and will not be released again for public comment.)

EPA welcomes your input on the revised draft Water-Efficient Single-Family New Home Specification, revised Water Budget Tool, and revised Inspection and Irrigation Audit Guidelines. All interested parties are encouraged to review the revised materials and provide written comments by July 7, 2009. Written comments should be directed to watersense-newhomes@erg.com. All comments become a part of the public record.

Additionally, WaterSense will be conducting a public comment meeting in June 2009. Please check the WaterSense Web site (www.epa.gov/watersense/pp/new_homes.htm) for additional information as it becomes available.

For a snapshot of the next steps to finalize the specification for single-family new homes and launch the upcoming WaterSense New Homes program, see the timeline below.

- June – Release the final New Home Certification System
- June – Hold public meeting on the revised draft specification
- July and August – Review public comments on the revised draft specification
- September and October – Recruit and train new home certification providers
- November – Release final specification for water-efficient single-family new homes and a list of WaterSense licensed providers.

If you have any questions, please contact Allison Hogge at (202) 564-0627 or hogge.allison@epa.gov, or the WaterSense Helpline at (866) 987-7367 or watersense@epa.gov. We look forward to receiving your feedback on the specification.

Sincerely,

Sheila Frace
Director,
Municipal Support Division
EPA's Office of Water

Significant Changes in the Revised Draft Specification and Related Materials

In response to public comments, EPA has made both major and minor changes to all aspects of the draft specification for water-efficient single-family new homes. Significant changes to the indoor and outdoor water-efficiency criteria, homeowner education criteria, and water budget tool are listed here and described below.

The significant changes to the indoor water-efficiency criteria include:

- Eliminated the criterion that all hot water pipes be insulated;
- Revised the criterion for the performance of hot water delivery systems;
- Developed a criterion that all water-using fixtures, appliances, and equipment be checked for leaks; and
- Expanded the criterion for water softeners.

The significant changes to the outdoor water-efficiency criteria include:

- Revised the criterion that the entire yard be landscaped in all cases;
- Redefined "landscapable area;"
- Changed the water adjustment factor (Kwa) of 60 percent to an evapotranspiration adjustment factor (ETAF) of 70 percent;
- Revised the criterion for ornamental water features;
- Revised the criterion for designing, installing, and auditing irrigation systems;
- Developed a distribution uniformity criterion for irrigation systems; and
- Developed a criterion for the requirement of a rain shut-off device.

The significant changes to the homeowner education criteria include:

- Developed a criterion that builders provide homeowners with a drawing record (schematic) of the irrigation system, if installed.

The significant changes to the water budget tool include:

- Changed the timeframe from annual to peak watering month;
- Revised the landscape coefficients; and
- Revised the default irrigation system distribution uniformities.

Indoor Criteria – Insulation of Hot Water Pipes

EPA received comments in support of and against the criteria that all hot water pipes be insulated to a minimum of R4. Research indicates that there are water and energy savings associated with the delivery of hot water through insulated pipes during concurrent draws. The insulation allows less heat to dissipate from the pipes and, therefore, hot water is delivered more quickly once the pipes are warmed from previous draws. EPA does believe that insulating hot water pipes located below-grade, below-slab, and in crawlspaces may be cost-effective in some climates. However, there is limited data supporting water savings from the delivery of hot water through insulated pipes when draws are not concurrent. Household water usage patterns indicate that hot water is typically used in the mornings and evenings and that many hot water draws might not be close enough together to benefit from the water savings associated with pipe insulation. Therefore, due to the limited water savings and high costs associated with pipe insulation, EPA has eliminated the criterion that all hot water pipes be insulated from the revised draft specification.

Indoor Criteria – Hot Water Distribution Systems

EPA received many comments in favor of setting a single performance standard for hot water distribution systems instead of requiring the use of specific types of delivery systems. Although EPA believes that the three systems identified in the draft specification (demand-initiated hot water recirculating system, whole house manifold system, core plumbing system) will be used by builders in water-efficient homes, EPA agrees that developing a performance-based specification provides more flexibility to builders and accommodates more diverse floor plans.

EPA also received comments on required pipe sizes and the expected piping runs between hot water sources and the farthest plumbing fixtures. Based on these comments, EPA believes that revising its calculations to reflect increased pipe diameters and greater distances between hot water sources and fixtures will allow more builders to participate in the program while still achieving its objective that builders install water-efficient hot water delivery systems. Therefore, EPA determined that a maximum of 0.60 gallons of water stored in the piping between the hot water source and any hot water fixture would adequately accommodate the expected distances to fixtures from the hot water source (20 to 30 feet) and the combination of pipe sizes (e.g., 3/4-inch trunks, 1/2-inch branches) used to make the connections in a home. EPA also believes that specifying a performance standard of 0.60 gallons will alleviate concerns that builders will try to meet the criteria using too small a diameter of piping.

Indoor Criteria – Leaks

Many commenters stated that EPA should require inspectors to check for leaks at all visible supply connections and valves. EPA agreed that inspectors should be looking for leaks during their inspection and, therefore, included a requirement in the revised draft specification that there be no visible leaks from any water-using fixtures, appliances, or equipment. Based on comments from pilot builders and their inspectors, EPA believes that there should not be any increased cost for inspectors to look for leaks as they verify the fixtures, appliances, and other equipment installed in the home.

Indoor Criteria – Water Softeners

During the past year EPA has been conducting additional research on water-efficient water softeners and determined that water softeners are common in regions of the country where hard water is prevalent, with cation-exchange water softeners being the most common and most reliable technology.

While the volume of water consumed by these softeners has decreased significantly in recent years, water softeners still generate and discharge a significant volume of wastewater. To minimize water consumption and reduce the amount of salt discharged into septic and sewer systems, the NSF/ANSI Standard 44–Residential Water Softener Testing and the Water Quality Association's (WQA) S-100 Residential Water Softener Testing Standard include a voluntary set of requirements for efficiency-rated residential cation-exchange water softeners. All residential cation-exchange water softeners sold in the United States must be certified to the general requirements of NSF/ANSI Standard 44 (or WQA S-100). The voluntary efficiency requirements found in Section 7 of NSF/ANSI Standard 44 are for manufacturers looking to differentiate and market their products as water- and salt-efficient.

WaterSense also received comments recommending that EPA require only demand-initiated regeneration water softeners because they use auto-initiated regenerations initiated via a water meter or water hardness sensor that reduce the amount of wastewater generated. In contrast, devices using time-clock-initiated regenerations discharge regardless of the amount of water that has been treated and regardless of the amount of treatment capacity that may be remaining in the unit. WaterSense also received comments against the use of salt-based softeners. Based on the new research and these comments, EPA believes that NSF/ANSI Standard 44 voluntary requirements for efficiency-rated residential cation-exchange water softeners identifies and designates models that use water and salt efficiently and that incorporate the desirable demand-initiated regeneration technology. Therefore, EPA has incorporated the NSF/ANSI voluntary efficiency requirements into the revised draft specification.

Outdoor Criteria – Landscaping the Yard

WaterSense received comments arguing against a uniform requirement that the entire yard be landscaped. Commenters believed this requirement would greatly reduce the potential for builders to participate in WaterSense in markets where the prevailing practice is to landscape only the front yard of new homes. To research this issue further, EPA conducted telephone focus groups of various sizes with 40 builders across the country to discuss their standard landscaping and irrigating practices. Based on this research and other conversations with builders and developers, EPA determined that most builders landscape the front of the house using primarily turfgrass. Although custom homebuilders tended to landscape the entire yard more often than larger builders, there did not appear to be any geographic link to the landscaping practices. EPA also learned that many builders do install irrigation systems in their landscapes.

To encourage maximum builder participation and to work within the current landscaping practices of most builders, EPA has revised the landscape design criteria to require that every home seeking the WaterSense label must landscape the front yard to meet WaterSense criteria. However, to address builders who are landscaping the entire yard as part of their standard package or are installing pools, spas, water features, and/or irrigation systems, EPA is requiring that the entire yard be landscaped to meet WaterSense criteria in these instances.

WaterSense also received comments on setting a minimum lot size for the landscape design criteria. EPA agrees that on very small lots, such as those associated with some townhomes, it would be difficult to allow for a useable amount of turfgrass and still meet the landscape design criteria. Therefore, EPA has exempted lots with less than 1,000 square feet of landscapable area from the landscape design criteria.

Outdoor Criteria – Definition of Landscapable Area

EPA also revised the definition for "landscapable area." Since the release of the first draft of the specification, WaterSense has received numerous comments on areas of the lot that should or should not be subject to the landscape design criteria. EPA agrees that the definition should exclude areas designated as rights-of-way, drainage or utility easements, and septic drainfields. Therefore, EPA conducted research on definitions used by other green building programs to see if they had addressed these areas of concern. EPA believes that the definition included in this revised draft specification (i.e.,

"buildable lot area excluding area under roof"), which is based on the U.S. Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED) for Homes program's definition of the "designed landscape", is simple and sufficiently broad to address the long list of non-buildable areas that may be encountered at a given site.

Outdoor Criteria – Ornamental Water Features

EPA received hundreds of comments on the beneficial uses of water features commonly installed in homes and conducted several conference calls with key stakeholders representing this industry to better understand the type of water features installed in new homes. Many commenters recommended that EPA treat water features in the same manner as pools and spas. EPA has revised the criteria to allow the installation of ornamental water features that recirculate water and serve a beneficial use. EPA believes that this requirement helps differentiate closed system water features that contain and recirculate water from those features that are less efficient. The revised draft specification also requires that the water surface areas of the water features be deducted from the turfgrass allowance and included as landscapable area under the landscape design options, which is also the requirement for pools and spas.

Outdoor Criteria – Plantings on Slopes

Due to the runoff concerns associated with irrigating turfgrass installed on slopes in excess of 4 feet of horizontal run per 1 foot vertical rise (4:1), the first draft specification stated that turf shall not be planted on slopes greater than 4:1. However, as many commenters identified, EPA did not specify what, if anything, should be planted on the slopes. EPA's intent was that the slope would be planted and not left bare. Therefore, EPA has revised the criteria in the specification to state "non-irrigated plantings other than turfgrass shall be installed on slopes in excess of 4 feet of horizontal run per 1 foot vertical rise (4:1)."

Outdoor Criteria – Design, Installation, and Auditing of Irrigation Systems

EPA received many comments arguing against the use of WaterSense irrigation partners to design, install, and audit irrigation systems installed at homes seeking the WaterSense label. These commenters believe that there are other qualified individuals who can design and install water-efficient irrigation systems and some questioned the availability of WaterSense irrigation partners. EPA agrees that there are other individuals that can install water-efficient irrigation systems that meet the criteria for WaterSense labeled new homes. EPA also believes that through existing partnerships and use of local irrigation professionals, builders may be able reduce the costs associated with designing and installing irrigation systems. Therefore, EPA has eliminated the requirement that all irrigation systems be designed and installed by WaterSense irrigation partners. However, to ensure that the installed systems meet WaterSense criteria, EPA has retained the requirement that a WaterSense irrigation partner must audit each irrigation system.

Outdoor Criteria – Irrigation Systems Achieve Specified Distribution Uniformity

EPA received several comments recommending that EPA require a specific uniformity standard or efficiency percentage for the irrigation system. Suggested distribution uniformity values ranged from 60 to 75 percent. EPA agrees with the commenters and added a criterion to the revised draft specification that the irrigation system shall achieve a lower quarter distribution uniformity (DU_{LQ}) value of 70 percent to help ensure the system is operating efficiently at the time of installation.

Outdoor Criteria – Irrigation Systems Interrupted During Rainfall

EPA received numerous comments recommending that EPA require irrigation systems to be equipped with technology that inhibits or interrupts operation during rainfall. EPA agrees that equipping irrigation systems with devices to stop operation during periods of rainfall will reduce the amount of water wasted during landscape irrigation. Rain sensors can be purchased quite inexpensively, therefore, EPA does not believe this requirement will add significantly to the costs of the irrigation system.

Homeowner Education Criteria – Information on Irrigation Systems

Homes that are labeled under the WaterSense program are certified to meet water-efficiency criteria at the time of inspection. EPA understands that after homeowners move into WaterSense labeled homes, keeping the homes water-efficient will require maintenance, especially with respect to irrigation systems. To help educate homeowners on the irrigation systems installed in their homes, EPA is requiring that builders provide the homebuyer with a schematic of the system and copies of the two irrigation schedules developed for their system. The WaterSense materials on efficient indoor and outdoor water use shall also be provided to homeowners.

Water Budget Tool – Required Use

Due to concerns raised by commenters about inconsistent approaches used to calculate a water budget, EPA is requiring the use of the WaterSense water budget tool if the builder selects Option 2 to fulfill the landscape design criterion.

Water Budget Tool – Peak Watering Month

EPA received many comments recommending that the tool be based on a peak watering month instead of an annual timeframe in order to better reflect the conditions during the growing season, which is the period of time when plants need the most water and precipitation is utilized by the landscape. The annual timeframe did not discern between forms of precipitation, such as snow and rain, and allowed natural water falling outside of the growing season to be incorporated into the budget. To address these concerns, EPA revised the timeframe to the peak watering month, which is consistent with other water budget tools used around the country, including USGBC's LEED for Homes water budget tool. Users will base evapotranspiration and rainfall data on the peak month for their area.

Water Budget Tool – Water Adjustment Factor

EPA received a number of comments in support of different water adjustment factors (K_{wa}). Some stakeholders expressed concern that a 60 percent adjustment factor would limit the use of native plants in certain regions of the country and/or would not allow the landscape to survive. To address these concerns, EPA has increased this factor to 70 percent. Additionally, EPA is clarifying the use and intent of the water adjustment factor, now called the evapotranspiration adjustment factor (ETAF). The intent is not that all areas of the landscape can only be watered at 70 percent of the local reference evapotranspiration (ET_o). The intent is that the landscape should be designed so that, as a whole, it requires 70 percent of the amount of water that a similar-sized lot composed entirely of turfgrass would require. A variety of high, medium, and low water-using plants, as well as nonirrigated areas, can be used in the landscape to meet this requirement.

Water Budget Tool – Landscape Coefficients

EPA received numerous comments on the use of landscape coefficients based on California data and the lack of local data for use in the "custom" areas of the tool. In addition, multiple commenters noted that there was no option to designate low water-using plants. After conducting additional research with various stakeholders, academics, and cooperative extension services around the country, EPA determined that this body of data and/or a single source of regional landscape coefficients for common species is not available. While efforts in the landscape community are being made to produce a clearinghouse for landscape coefficient data, EPA is moving forward by adopting the species factor values used in USGBC's LEED for Homes Rating System Sustainable Sites Criteria 2.5 (2008). This table, based on the Water Use Classifications of Landscape Species published by the University of California Cooperative Extension, includes low, medium, and high water requirements for trees, shrubs, groundcover, and turfgrass. EPA is aware that these values are still based on California data, but believes this to be the best data currently available. EPA also eliminated the option of entering custom values until more landscape coefficient data is readily available for users.

Water Budget Tool – Run Time Multiplier, Irrigation Efficiency, and Distribution Uniformity Values

EPA received multiple comments noting that the denominator of the run time multiplier should be "distribution uniformity," instead of "irrigation efficiency." EPA changed the terminology in the equations and in Table 3 to reflect this recommendation.

EPA also received comments that the irrigation efficiencies (now lower quarter distribution uniformity values) were too high. EPA addressed these concerns by lowering the distribution uniformities from the "Excellent" level to the "Very Good" level as listed in Table 1-8 and Table 1-9 of the Irrigation Association's *Landscape Irrigation Scheduling and Water Management* (2005).

Inspection Guidelines

EPA received multiple comments that the inspection guidelines should be updated to reflect changes to the specification and released again for public comment. EPA agrees with these commenters and has included updated inspection and irrigation audit guidelines with the revised specification.

Appendix C

Domestic Hot Water System Piping Insulation: Analysis of Benefits and Cost

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Domestic Hot Water System Piping Insulation: Analysis of Benefits and Cost

Background

Increasing the efficiency of water heating equipment is one means to achieve energy savings in the hot water system; however, the piping distribution system itself is now being scrutinized to determine opportunities for further hot water system savings. Often accepted approaches to energy savings in the hot water piping system are to reduce the length of piping to the outlets and to insulate the hot water pipes. Less regarded as an energy savings feature is the reduction in size of the hot water lines to outlets, which can reduce pipe losses, as other plumbing system performance issues such a pressure drop and fluid velocity must be considered. All of these approaches will result in lower piping system losses. The purpose of this study is to outline the mechanisms of energy savings in the piping distribution system and to estimate the range of energy savings resulting from pipe insulation based on simulated hot water use profiles.

This study was commissioned by the National Association of Home Builders (NAHB) with the purpose of understanding the energy savings available by insulating hot water piping in homes relative to the cost of the insulation, both in materials and installation. The study includes references to the existing body of research as well as results of new analyses of hot water distribution systems with various options for insulating hot water piping.

Background: Hot Water Piping Energy, Water Use, and Loss Mechanisms

Domestic hot water piping systems are designed to deliver hot water from a source (the water heater) to the outlet. The piping design must account for the source pressure and the design flow rate to ensure an adequate supply of hot water volume to the outlet. These design constraints directly influence the energy loss of the piping system. For example, in long plumbing runs, the pipe size may be increased to reduce flow losses leading to larger volumes of hot water in the piping and increased energy losses, both during the draw and after the draw as the volume of hot water cools. In addition to these energy losses during a water use event, occupant control characteristics will affect the total energy loss from the hot water system such as wasted warm/hot water while waiting for hot water to arrive at the outlet and the desired water temperature at the outlet (that affects the amount of cold water mixing) to reach the desired level.

Given these hot water use characteristics that directly affect the total energy use of the hot water system, an outline of the specific mechanisms contributing to energy (and water) losses is shown in Table 1.

100

Table 1 - Factors Affecting Hot Water System Energy Use

Property	Energy Use Mechanism	Loss Consequence
Pipe material, length and location	Heat transfer through the pipe to the surrounding based on conductivity and the environmental temperature around the pipe	• Energy loss during flow • Energy loss at the end of the flow event (cool down) • Water loss waiting for hot water at the outlet
Intention of use	Volume of hot water in the piping based on a desired temperature (i.e. shower) or fixed volume (i.e. dishwasher)	• Water waste waiting for hot water at the outlet • Increase in water heating energy based on the need for hotter water at the outlet
Flow rate	Heat transfer through the pipe to the surrounding during use	Magnitude of loss relative to total volume of use increases with a decrease in flow rates
Interval between use	Heat loss during pipe cool down after a use event	Energy and water loss dependent on the time to the subsequent use
Cold water temperature at the outlet	Volume of hot water used dependent on the desired temperature at the outlet, if set	Larger volume of hot water is used with colder incoming water temperature

As outlined, the confluence of parameters involved in the determination of hot water system losses increases the complexity of determining the affect of any one aspect leading to higher energy losses relative to the total energy use in the hot water system. This affect is clearly seen in the energy factor (EF) rating for water heaters which is highly dependent on the time frame and use pattern of the test procedure. For any actual home, the EF may be significantly different from the equipment rating, for example, in homes where there is large hot water use throughout the day, the actual EF may be much higher, where the opposite would be true for homes that use much less hot water than the test procedure.

Furthermore, the losses from the hot water system are all relative to the total energy supplied to the hot water system such that homes with low hot water use due to consumer behavior (including the choice of low-flow faucets) may reduce the total energy used in the hot water system, the ultimate benefit desired. However, in all homes, the performance of the hot water system may be improved (e.g. faster hot water delivery, lower piping losses, etc.) through the system design.

This study focuses on one aspect of the system design – insulating hot water piping as a means to reduce energy (and corresponding water) losses. It must be noted that this study did not evaluate recirculation systems which presents a different set of analysis complexities including the type of recirculation system, the actual layout of the system, the pumping energy, and the control mechanisms based on occupant behavior at a particular use point.

Published Hot Water Energy Use Research

A literature search was performed to review the current information available relating to hot water energy use in homes and specifically concerning the application of insulation for the piping. The relevant literature is annotated in Appendix A. Few studies specifically focused on pipe losses from domestic hot water systems. The most significant studies were published in 2004 [Baskin et. El. 2004] through 2006 [Hiller] that used analytical and some laboratory test methods to demonstrate the scope of losses from domestic hot water piping. These studies, while not applied to realistic hot water use

For example, using 20 feet of Type L copper pipe, there is a difference of over a quart of water from 1/2" to 3/4" pipe diameter. For a typical 2,200 square foot home plumbed with a combination of 3/4" and 1/2" Type L copper, there can be over 3 gallons of water in the hot water piping alone.

Environmental Temperature

Energy losses from hot water piping systems are also dependent on the environmental temperature surrounding the pipe. Previous analysis [Baskin et. Al. 2004] has indicated that hot water pipes located in the ground beneath slab foundations would benefit from insulation in all cases since the pipe losses are increased both during and after the flow event. In addition, the pipe temperature is more quickly brought to that of the surroundings (if pipe not insulated) due to the direct contact with the earth.

For above-ground pipes, pipe losses due to the temperature of the environment surrounding the pipe were analyzed for 2 conditions to highlight the affect of placing hot water pipes in either an open crawlspace (at a constant temperature of 50 °F) or in a basement (at a constant temperature of 65 °F). The pipe losses (not hot water heater energy savings) are estimated to be reduced from about 4% to as much as 13% for the given flow event (refer to Figure 1, compare the first 2 columns in each piping configuration). In most homes, the temperature surrounding the pipe could have a large range depending on the climate, the location of the pipe, and the temperature set-points in the house. It is likely that not all of the piping would see a uniform temperature and the temperature around the pipe would be expected to change through the year.

Cold Water Temperature

Another factor that influences the use of hot water and the amount of losses in the piping system is the incoming cold water temperature. The cold water temperature influences the water heating energy (colder water requires more energy to heat to a set temperature), and the amount of hot water used (for a set temperature at the outlet, more hot water must be mixed with colder water). This variable is not obvious since it would seem that the cold water temperature would not change the hot water piping losses directly. The importance of the cold water is the mixing of the hot water required to bring the water to a comfortable temperature at the outlet. The colder the incoming water, the more hot water is required to keep the outlet temperature at the desired level. Based on the characterization simulations, the effect of the cold water temperature (either 55 °F or 65 °F from a 45 °F base) reduces the resulting hot water pipe losses from 7% to 33% when the pipes are located in a colder location (50 °F environment), and from 9% to 24% when the pipes are located in a warmer location (65 °F environment). The savings (refer to Figure 1, compare the 1st and 3rd and 1st and 5th columns in each piping configuration group) are somewhat consistent and independent of the pipe being insulated indicating that the cold water temperature is a secondary effect when analyzing pipe losses[4]. Figure 1 above charts the data by characterization test.

Pipe Moterial

Another factor that appears to influence the pipe losses is the material used for the piping. Metal pipes have a higher heat loss coefficient than plastic pipes. The HWsim simulation software incorporates heat transfer coefficients for materials for use in heat loss calculations. The conductivity for metal piping (copper) is significantly higher than that of the plastic materials except for PEX materials with a metal sleeve. Within the plastic materials, PEX has a much lower conductivity than CPVC but the difference is much less than the relative conductivity to the metal piping, resulting in little measurable loss reduction between PEX and CPVC. Based on the characterization study, plastic piping materials result in a

[4] The cold water temperature is a primary effect however in the total hot water energy used at the water heater. This effect is generally independent of the piping system.

reduction of pipe losses from 27% to about 13% over metal piping with higher savings occurring when the other factors result in more losses (e.g., with colder water temperatures or a colder location for the pipe). The summary data in Figure 1 shows this trend for plastic pipe material compared with metal.

Pipe Insulation

An often suggested solution for reducing losses in the hot water system is to use insulation around the piping materials. The characterization study detailed in Figure 1, including variables such as pipe material and environmental temperature, evaluated the use of pipe insulation on the entire length of pipe from the tank to the outlet. The insulation thickness selected, one inch, was the higher of what is typically found in domestic hot water systems. The reduction in piping losses from adding insulation for metal piping is about 24% to 35% and about 20% to 25% for plastic pipe. The absolute loss reduction (Btu value) when using insulation on each of the respective pipe materials is about 40% less for plastic pipe than that of metal. Figure 3, a subset of Figure 1, graphically charts these results.

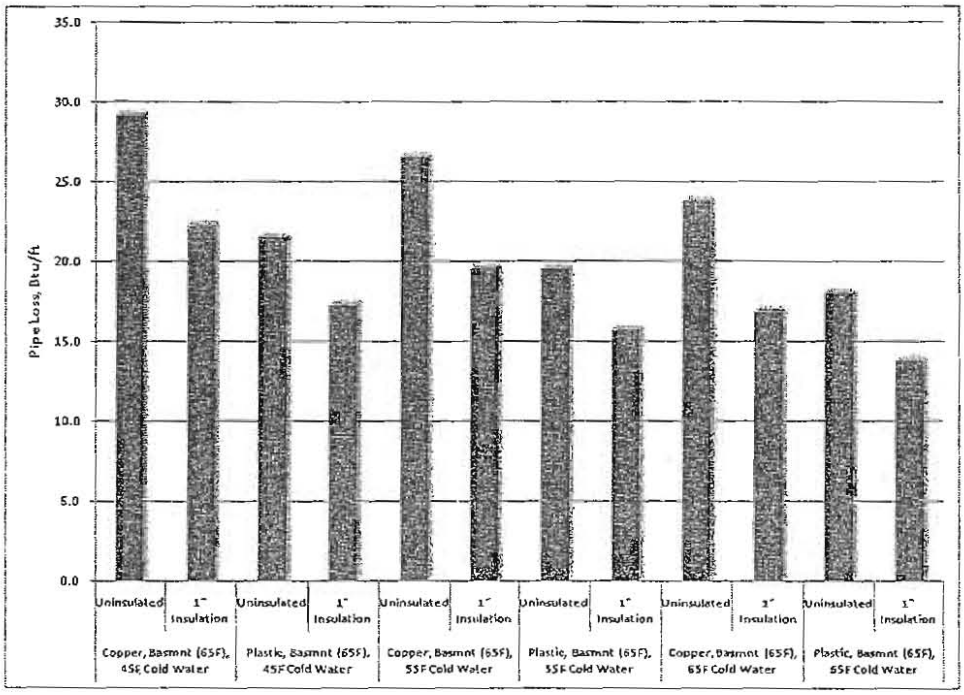

Figure 3 - Pipe Loss Reduction When Using Insulation with Pipe Located in 65°F Environment

Analysis 2 - Parametric Study of the Domestic Hot Water Distribution System

While the characterization of the hot water system summarized in Study 1 is valuable in understanding the various factors influencing pipe energy loss, this parametric study provides more detail on the interaction between performance variables such as the amount of hot water use, the interval between use events, and the length of pipe to the outlet. Based on previous studies [Hiller, 2005], these are the primary parameters of interest when evaluating the benefit of pipe insulation. Because these factors are difficult to define for a general analysis, a parametric study can help provide boundaries for the expected performance range within each factor. Table 3 outlines the parameters and the range of conditions used in the parametric study.

Table 3 - Parametric Study Parameters & Conditions

Parameter	Condition 1	Condition 2	Condition 3	Condition 4
Pipe Material	Metal (copper)	Plastic (CPVC)		
Environmental Temperature	60 °F			
Daily Hot Water Use	60 gpd			
Interval Between Draws	1 minute	10 minutes	30 minutes	60 minutes
Pipe Length to Outlets	30 feet	60 feet		
Insulation	0" thick	1/2" thick	1" thick	

The parametric study focused on evaluating the interaction of the parameters identified to contribute most to heat loss from the piping system. These parameters are based on the range of system designs (moderate and longer pipe lengths), a range of intervals between hot water use (1 to 60 minutes), a range of pipe insulation levels (none to 1" thick), and two different pipe types (metal and plastic). Other parameters such as the temperature surrounding the pipe (set as a conservative estimate of a cooler location) and the total water use (set at 60 gallons per day which is similar to average values used in various programs), are kept constant. The piping configuration was set such that there are three outlets representing a kitchen sink, a sink basin, and a shower, with all set to the same distance from the water heater tank (30' or 60'). The pipe sizes for the parametric study ranged from a nominal 3/4" for the supply lines to a nominal 1/2" to the outlets. A water use profile was developed for three common outlets in the home as shown in Table 4.

Table 4 - Parametric Study Use Points and Draw Levels

Daily Hot Water Use for Three Fixtures						
	Volume per Event		Events	Daily Use	Flow Rate	Duration
Fixture C[1]	0.5	gallon	24	12 gallons	1.50 gpm	20 sec
Fixture B[2]	1.0	gallon	12	12 gallons	1.00 gpm	60 sec
Fixture A[3]	18.0	gallons	2	36 gallons	2.25 gpm	480 sec
Outlet similar to [1]Kitchen sink, [2]lavatory sink, [3]shower						

The size of the pipe is a secondary factor as is the flow rate and duration of the use (which are dependent on the occupant use). The parametric study is focused primarily on the length of pipe and the time between hot water events. The other factors are set (e.g., the piping system design and layout) and a flow regime is specified for each outlet. The flow rate and total volume is set for the outlet providing a range of draws, albeit limited, to represent what might be expected in a typical household. *The artificial specification of the time between draws does not represent a typical household but does highlight the differences between the different draw profiles.*

Figures 4 and 5 graphically represent the interaction between pipe material (metal or plastic), pipe length to the outlets (30 or 60 feet), the interval between draws (1, 10, 30, or 60 minutes), and the amount of insulation on the pipe (none, ½", or 1"). Insulation is assumed to fully cover all hot water pipes in the system from the hot water tank to the outlets. The results are based on an annual simulation with the same daily draw profile and volume use for each day of the year.

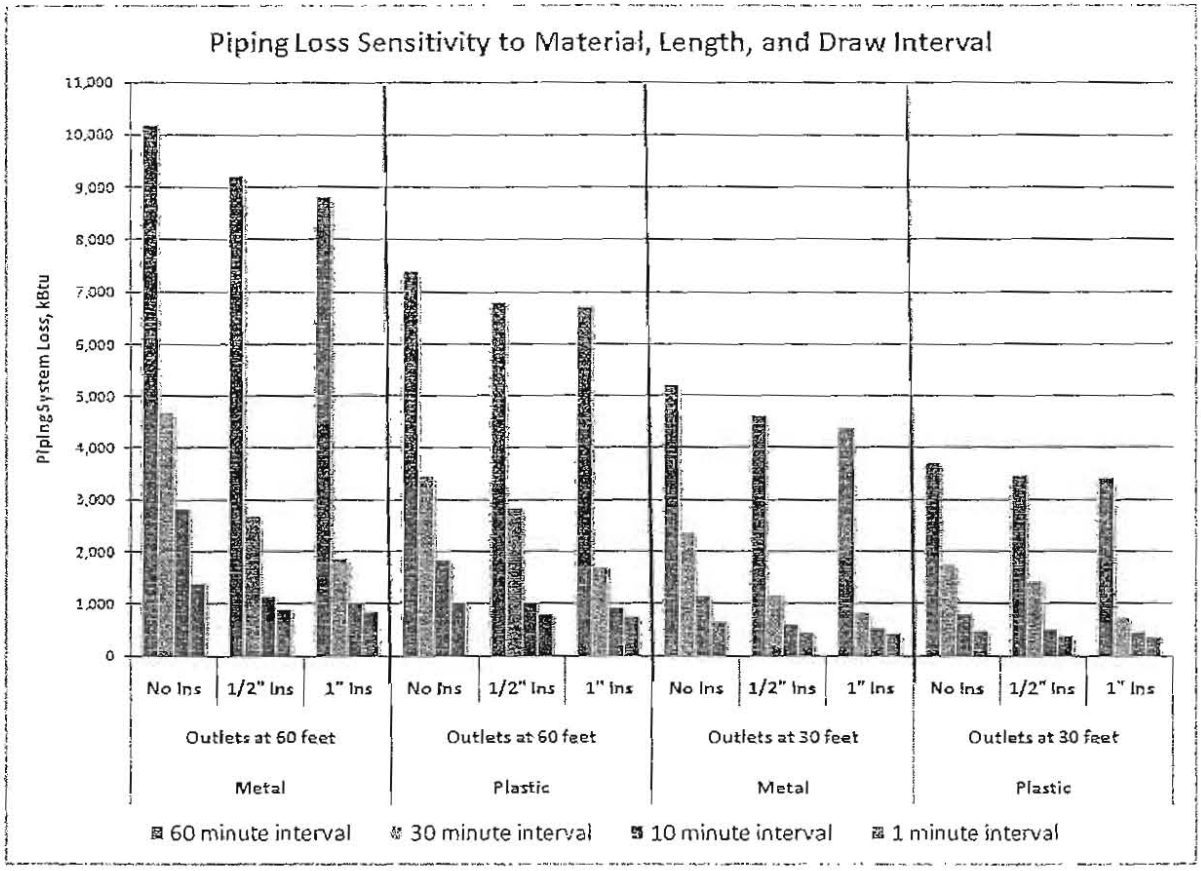

Figure 4 - Pipe Loss Comparison using Parametric Analysis

Each bar series in Figure 4 represents the time between draw events. The comparison for each bar series is shown for the other parameters. For example, looking at the 60 minute interval series, the effect of the insulation in reducing the piping loss for outlets at 60 feet and metal piping is about 1,000 kBtu for ½" thick insulation and about 1,400 kBtu for the 1" insulation relative to the configuration without insulation. In addition to the comparison between the pipe materials and outlet distance, each pipe material for the given distance to the outlets may be compared. . For example, for uninsulated pipe at 60 feet to the outlets, the plastic pipe material results in a pipe loss reduction of about 2,800 kBtu, a higher reduction than insulating the metal pipe. However, this result applies to the 60 minute interval between hot water use events only. Results from the parametric study include the following summary conclusions (also refer to Figure 5):

- When draw events are spaced over 30 minutes apart, the effectiveness of insulation diminishes significantly.
- When draw events are spaced between 10 and 30 minutes, 1" thick insulation on the pipes can reduce pipe losses by over 50%.
- Draw events spaced at 30 minutes apart show the largest benefit to insulation use.
- For draws less than 10 minutes apart, pipe insulation provides little additional benefit to reduce pipe losses.
- Plastic pipe materials reduce the pipe losses by about 25% compared with metal pipe materials.

- For metal pipes, the addition of 1/2" of insulation provides the majority of the benefit, whereas 1" insulation is more beneficial for plastic pipe.

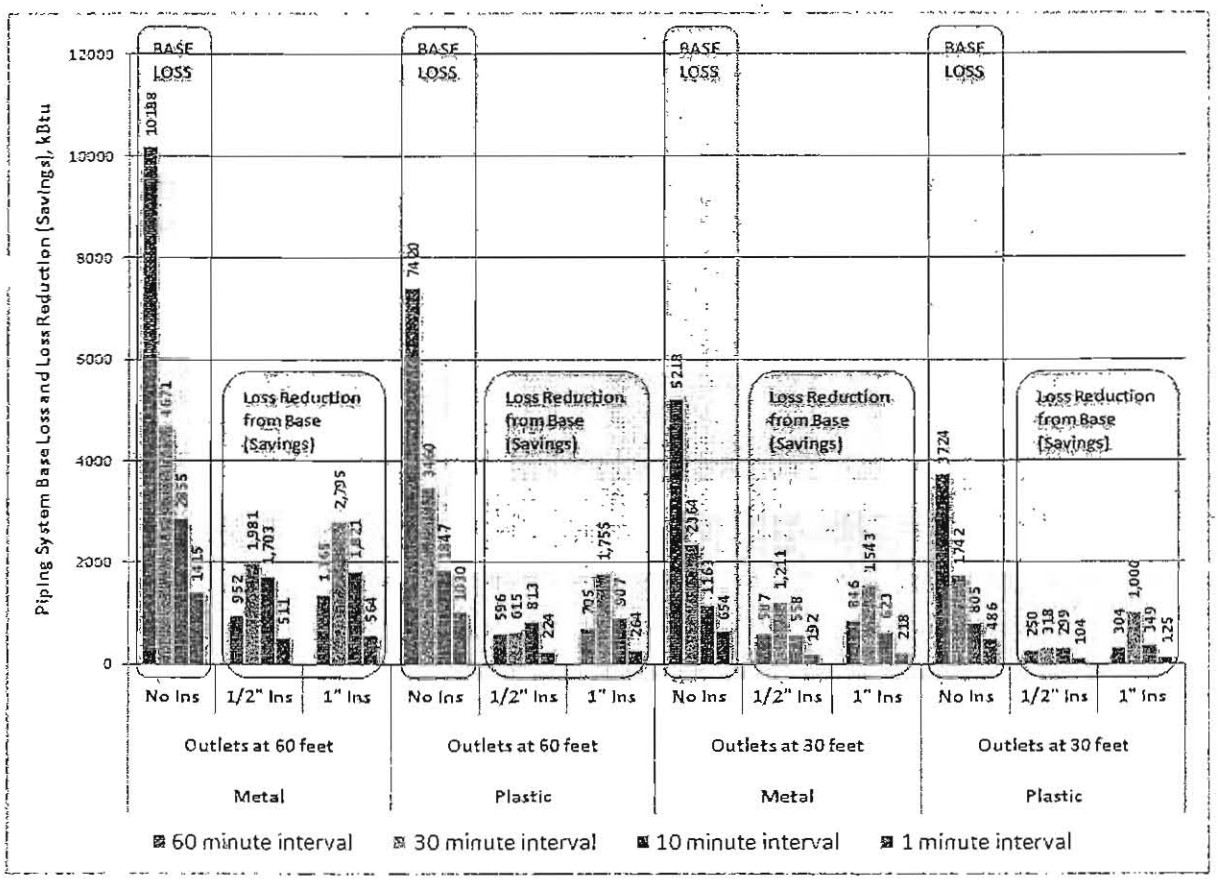

Figure 5 - Piping System Loss and Loss Reduction for Insulated Pipes

The results shown in Figures 4 and 5 are intended to demonstrate the extreme values for hot water piping system losses in any household. The extremes encompass both the length of pipe and the time between draws. In addition, an estimate of hot water use was incorporated that assumed all hot water use began once hot water arrived at the outlet. This is not the case for most dishwashers and clothes washers and may not be true for all sink uses. Typically, hot water use is much more varied throughout the day both for flow rate and the time between uses and the wait time for hot water to arrive at the fixture. Furthermore, the hot water system design generally incorporates various lengths of pipe to the outlets. Given these constraints, the energy use estimated outlines the various influencing factors in hot water energy use and compares the various factors with respect to the pipe material and the level of insulation. However, they do not represent actual losses (or savings) in a real household.

However, as Figures 4 and 5 describe the energy savings, the assignment of cost to the savings when using insulation on the entire length of hot water piping can provide additional perspective for the various systems and use profiles. Figures 6 and 7 detail the annual energy cost savings with pipe insulation for gas and electric water heaters and also compares the average annual energy cost savings over 1, 10, 30, and 60 minute intervals.

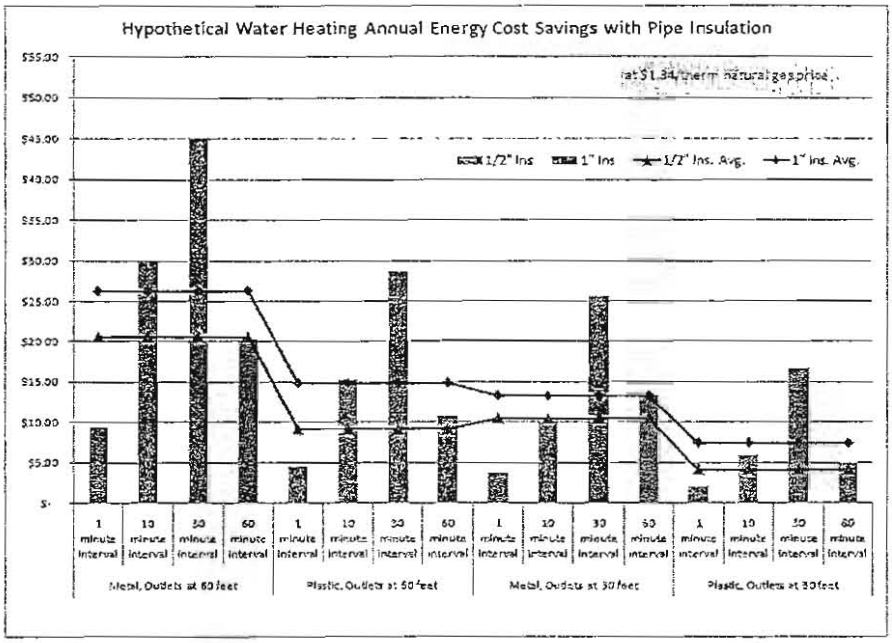

Figure 6 - Cost Value of Savings for Insulated Pipe Given the Stated Parameters - Gas Fuel

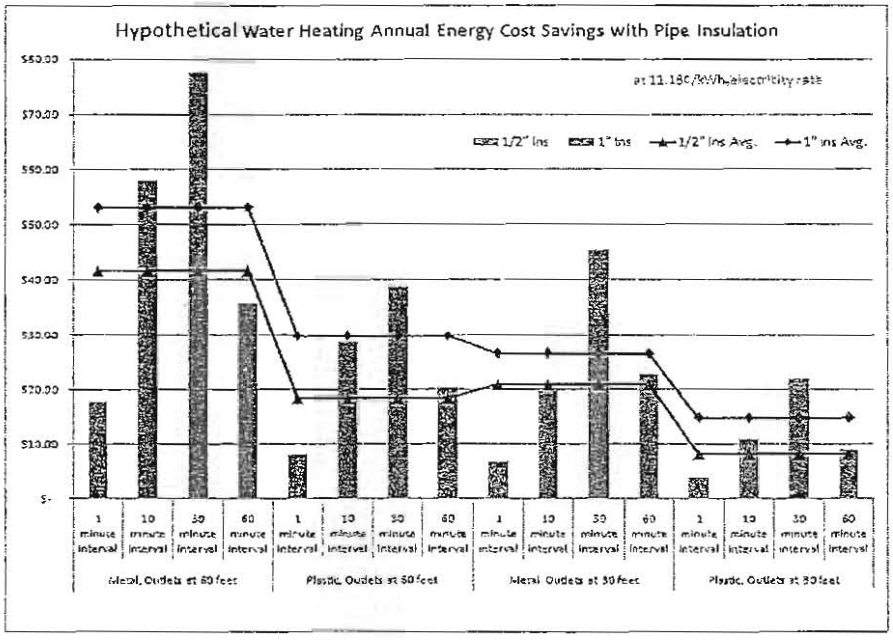

Figure 7 - Cost Value of Savings for Insulated Pipe Given the Stated Parameters - Electric Fuel

Fuel prices are taken from the Energy Information Administration data for the average annual U.S. price. Any changes in the fuel prices will be reflected directly in the savings. For example, if electric rates increase by a third to 15 cents/kWh, the savings would increase by a comparable amount. Figures 6 and 7 demonstrate the cost savings when using both 1/2" and 1" thick insulation on all hot water piping sections. The data can be summarized in the following details:

- The majority of the savings when using insulation is from the initial layer. Adding more insulation provides more limited benefit. The exception is plastic pipe when the interval between draws is 30 minutes where the benefit is equally divided between the first 1/2" of insulation and 1" thick insulation.
- Plastic pipe, due to its lower conductivity, results in average savings similar to reducing the length of metal pipe by a half.
- Reducing pipe length is of significant benefit, both in operating cost and in the cost of installation.
- The consistent 30 minute intervals between uses show the most benefit from insulation.

Although the performance issues afforded through a parametric analysis are of value in determining beneficial design details, an analysis of a "typical" home will provide an overall picture of the hot water system performance using insulated piping.

Analysis 3 - Whole House Hot Water System Simulation

A third analysis of hot water system performance using HWsim was performed using a plumbing system layout design from a typical 2-story home with a basement. The layout is considered a typical hot water piping system using both 3/4" and 1/2" pipe sizes. The outlets are representative of typical new homes with multiple baths, kitchen and lavatory sink basins, dishwasher and laundry. Figure 8 diagrams the layout modeled for the hot water system analysis.

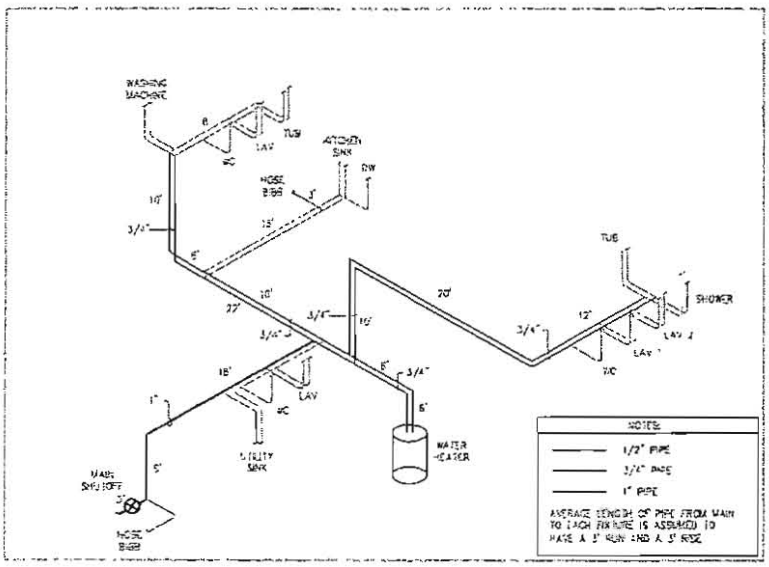

Figure 8 - Plumbing System Layout for Simulation

The simulation model incorporates various tee and branch pipe runs to the outlets. The pipe is assumed to be installed both in the basement area and in the first and second floor walls. The temperature surrounding the pipe is based on simulation runs of a house located in the Washington DC area with temperature variations modeled by month[5]. The cold water temperature is assumed to change throughout the year, by month, based on a methodology[6] developed through the Department of Energy's Building America Program (BAP).

[5] The temperature surrounding the piping would apply to a large number of homes across the US where the piping is installed indoors (either in a basement or in the walls or floors of the house). Differences in results would occur if the piping were installed under the slab or in unconditioned spaces, however the differences in the results would also vary from season to season based on the ambient air temperature.

[6] Refer to the Building America Research Benchmark Definition, Updated December 2009, NREL/TP-5S0-47246

With most hot water simulations, the major challenge in the simulation specification is the hot water draw profile. Numerous studies have been performed to develop hot water use profiles for equipment ratings, to estimate water use, and for energy analysis. An extensive research project was conducted at the National Renewable Energy Laboratory (NREL) that resulted in a use profiles for "typical" homes of various bedroom number [Hendron et. Al. 2008]. The profile selected for this study is the three bedroom profile. The profile is available on a six minute time interval for every day of the year except for a two-week period that represents a vacation period. The profile is based on a statistical analysis but provides a realistic estimate of the hot water use that might be expected in a home, including the variation in draw volumes and the time between draws. A significant feature of this profile is the assignment of outlets for various draw events[7], which were utilized in this analysis.

From the full year profile, a one-week period was extracted to represent the typical weekly profile of the household. The simulation software is limited to a 1-week profile that is repeated for all weeks of the year. The week selected was fairly representative of the overall daily use in a winter month (which uses more hot water than summer profiles). The data set selected sums to a hot water use of about 63 gallons per day (gpd) and a combined cold and hot water use at the fixtures of about 76 gpd. This average is close to the DOE water heater test standard[8] that uses 64.3 gpd. Figure 9 graphically displays the weekly hot water use profile set selected for simulation.

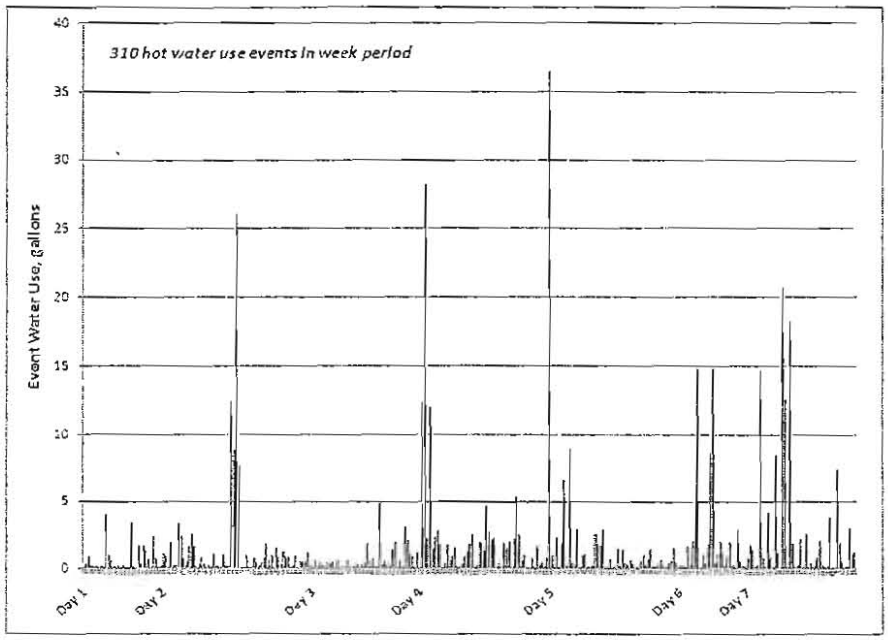

Figure 9 - Hot Water Use Profile

This weekly profile results in variations based on the outlet, the flow rate, the duration of flow, and the temperature set at the outlet, if applicable. For the whole house analysis, specific flow events are assigned to specific outlets which then are simulated with specific pipe lengths and sizes (see Figure 8).

[7] A common resource for residential hot water use profiles is the ASHRAE 90.2 standard, ANSI/ASHRAE Standard 90.2-2007. This standard does specify a daily profile on an hourly basis of the use factor (a percent of the total daily hot water use). The profile incorporates a diversity factor and therefore does not assign use by outlets.

[8] http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/d-2.pdf

The simulation repeats the daily profile for the week, for every month of the year. The software modifies the incoming cold water temperature and the environmental temperature around the pipes based on the time of year[9]. The software can accept a one-week profile only, however, the plumbing system layout detailed in Figure 8 with the weekly profile in Figure 9 resulted in approximately 300 flow events that were input to the software including start times, flow rates, and duration.

One other parameter defined for simulations is the outlet water temperature at specifically selected outlets that utilize a set temperature, such as a shower faucet. In this case, the software will flow hot water until the faucet is at the set temperature and then mix in cold water to keep the faucet temperature constant. This profile is applied to some sink faucets as well as the showers. Other faucets, the dishwasher, and the laundry are specified as appliances such that the hot water use is by volume only and the temperature is not a controlling factor.

The simulations were conducted for an annual period using the weekly use profile repeated for 52 weeks. The environmental conditions were varied monthly based on seasons. The simulation summary results are shown in Table 5.

Table 5 - Simulation Results for Typical Hot Water System and Use Profile

Performance Parameter	Metal Pipe, Uninsulated	Metal Pipe, Insulated, 1"	Plastic Pipe, Uninsulated	Plastic Pipe, Insulated, 1"
Annual Hot Water Use, gal	23,673	23,362	23,577	23,358
Daily Hot Water Use, gpd	64.9	64	64.6	64.0
Hot Water Waste, gal	430	221	290	174
Piping Loss, kBtu	2,416	1,226	1,860	1,108
Water Heater Energy, kBtu	21,377	21,041	21,227	21,010
Distribution Piping Efficiency	82%	91%	86%	92%
Water Heating Energy Cost, gas	$286.45	$281.95	$284.44	$281.53
Water Heating Energy Cost, electric	$525.38	$514.22	$520.31	$513.11
Annual Water Heater Energy Savings, gas (electric)		1.6% (2.1%)		1.0% (1.4%)
Total Annual Water Heater Energy Savings (Gas Fuel)	@ $1.34/therm	$4.50		$2.91
Total Annual Water Heater Energy Savings (Electric Fuel)	@ $0.1118/kWh	$11.16		$7.20

The summary data from the simulation indicates limited performance and cost benefits from the use of insulated piping based on statistical use profiles and a typical hot water piping system. Whereas the simulations are based on as complete system specifications as is available, the results are accurate in as much as an individual home mimics the simulation parameters.

[9] The values for the environmental temperature surrounding the pipe were based on house simulations in the climate.

Analysis 4 - Pipe Insulation Cost Estimates

The cost of pipe insulation products and estimated installation costs were developed as a reference point for evaluating the cost/benefit of using pipe insulation. Pipe insulation is typically sold in specific lengths and available in various thicknesses and can be foamed plastic (polyethylene), elastomeric, or fiberglass. Table 6 provides the summary of the cost estimates for installed insulation (1) developed based on retail material pricing and construction labor rates or (2) referenced directly from RS Means.

Table 6 - Installed Piping Insulation Cost Estimates

Insulation Specification		Material Cost (per foot)[1]	Installed Estimate[2,3]	Means[4] Estimate
Wall Thickness	Nominal Pipe Size			
1/2"	1/2"	$0.61 - $1.14	$510.68	$942.50
	3/4"	$0.46 - $1.29		
	1"	$0.82 - $1.55		
3/4"	1/2"	$0.91	$555.98	$1,034.60
	3/4"	$0.93 - $1.95		
	1"	$0.83 - $1.55		
1"	1/2"	$1.63	$703.34	$1,263.30
	3/4"	$1.89 - $3.22		
	1"	$2.23		

[1] *Retail material cost, no builder's O&P*
[2] *Hot water piping estimate at 80 feet of 3/4" and 98 feet of 1/2", using least cost material option*
[3] *An estimate of 1 day labor for a skilled mechanic with O&P is $392.40*
[4] *RS Means 2010 Residential Cost Data*

Using the least cost estimates for the piping insulation for 1" insulation thickness used in the simulations and the maximum estimated cost savings for an electric water heater, the payback period would be in the range of 60 to 100 years depending on the pipe material used. This estimate assumes all hot water piping is insulated completely from the hot water heater to the outlet.

Summary

Four different analyses were performed to characterize the performance of hot water piping systems and in particular to evaluate the energy and cost savings from insulating the hot water piping. The major factors that affect the energy loss from the piping systems were outlined and their affect on piping losses was demonstrated. Simulation software was used to compare the performance of different hot water system configurations, flow rates and hot water use profiles. Combining many factors together, the simulations demonstrate that the benefit of insulation is greatest when all of the hot water uses are spaced apart from 10 to 30 minutes. The benefit of insulation is diminished with shorter and longer time between uses. Individually, it was shown that pipes located in colder locations such as an unconditioned crawl space, benefit more from pipe insulation than pipes located in more conditioned spaces. Plastic pipe was shown to have less loss than metal pipe and commensurately insulation is more beneficial on metal pipe than on plastic pipe.

When a full hot water system is simulated in a single-family house using standard hot water use profiles with varying flow rates, time between draws, and pipe lengths from the hot water heater to the outlet, the benefit of pipe insulation is much less significant and the cost benefit to using pipe insulation is on the order of approximately $3 to $11 per year depending on the fuel rates, resulting in simple paybacks of 60 to 100 years based on a range of installed insulation costs.

Appendix A

Annotated Bibliography

Studies relevant to domestic hot water piping systems

Baskin, Evelyn, Robert Wendt, Roberto Lenarduzzi, and Keith A. Woodbury. 2004. "Numerical Evaluation of Alternative Residential Hot Water Distribution Systems." Report NA-04-5-3, *2004 ASHRAE Transactions: Symposia*: 671-681.

> This research investigated energy and water waste in residential domestic hot water delivery systems. Four different distributions systems in three different locations of a typical house were simulated. Results showed that hot water use patterns, pipe material, pipe layout, and recirculation systems have a significant impact on the energy and water waste. Pipe insulation decreased piping heat loss slightly in attics, noticeably in crawl spaces, and significantly below slabs. Conclusions for cold start usage results included CPVC systems have less piping heat loss compared to copper systems particularly in clay under slabs, pipe insulation on pipes buried in attic insulation slightly increases heat loss, and the most efficient systems with this use pattern are demand recirculation using CPVC in the attic and parallel pipe using PEX in the attic. Conclusions for clustered hot water usage results included conventional systems have the greatest heat loss in slabs and the least in attics, pipe insulation in crawl space and slab noticeably reduces pipe heat loss, and the most efficient systems for this use pattern are demand recirculation using CPVC in the attic and conventional with a centrally located water heater using CPVC in the attic. Both use patterns showed that continuous recirculation systems significantly increase piping heat loss and total heated water energy waster.

Review comments: Development of a simulation model to estimate energy losses from piping systems. Simulation modeling temperatures of the attic, crawl space, and soil (slab) appear quite moderate; different climate zones could produce significantly different results when the pipe is located outside of the conditioned space. The use profile modeled is a limiting factor in a broad application of the results except for the location of the pipe.

Wendt, Robert, Evelyn Baskin, and David Durfee. March 2004. *Evaluation of Residential Hot Water Distribution Systems by Numeric Simulation*. Report for Davis Energy Group by Building Technology Center Oak Ridge National Laboratory.

> The goal of this project was to evaluate the energy and water performance, economics, and barriers to use of various domestic hot water distribution systems in new and existing California residences. Heat loss was modeled for insulated and non-insulated hot water pipes; two draw cycles were investigated: cold start and clustered use; five new construction and two existing residences were studied; numerous changes were evaluated: alternative piping materials, centrally located water heater, additional pipe insulation, and demand and continuous recirculation systems. Model results showed consistent energy and water performance for the various scenarios however the results varied significantly (25-600%) with cold start or clustered water use patterns. The study concluded: continuous recirculation systems can reduce water

waste but should not be installed due to high cost and energy waste; demand recirculation pump systems reduce water waste and energy waste but add a significant first cost; water heaters should be centrally located for new homes; parallel pipe distribution systems may be an attractive alternative but energy and water savings are sensitive to hot water use patterns. The report included numerous specific recommendations for policymakers, designers, builders, and plumbers, and new and existing homebuyers.

Review comments: A useful analysis in the comparison between types of draw patterns. Analyzes the application of circulation systems on energy use. Simulation modeling limited to one state and uses a limited piping system. The use profile modeled is a limiting factor in a broad application of the results.

Hiller, Carl. November 2005. *Hot Water Distribution System Research - Phase I.* Report CEC-500-2005-161 to the California Energy Commission Public Interest Energy Research Program.

This extensive report quantified the time, water, and energy waste characteristics of the most common hot water distribution piping systems. One notable result was that hot water pipe insulation can increase piping cool-down time by a factor of two to four.

Review comments: Detailed laboratory effort to analyze and quantify heat loss from domestic hot water piping systems. Results however are not translated into estimated energy savings for homes operating under a use profile.

Hiller, Carl C. 2005. "Comparing Water Heater vs. Hot Water Distribution System Energy Losses." Report DE-05-1 *ASHRAE Transactions,* Volume III, Part 2: 407-417.

This paper compared hot water distribution system piping heat loss to standby losses of common water heater types based on laboratory tests on a variety of piping configurations in order to evaluate when it makes sense to have more than one water heater. Various energy losses due to distribution systems were categorized, including the three components of piping energy loss: cool-down of water left standing in the pipes after a draw, energy lost to ambient during hot water flow, and heated water that is wasted down the drain. This paper addressed heat energy losses during the delivery phase and during piping cool down. Measured UA factors are given for ½" and ¾" copper pipe with 0, ½", and ¾" thick closed cell polyethylene foam insulation. Test results included the observations that even a small amount of pipe insulation provides a large reduction in heat loss, that UA value increases at a low rate as a function of water flow rate and appears to become constant at higher flow rates, and that energy lost to water cooling down in the pipes between draw events is greater than energy lost during hot water flow or wasted down the drain. Calculated results included the observation that for non-recirculation loop systems, pipe insulation is of little benefit for draws spaced far apart and also when clustered within a short period of time, but pipe insulation can significantly reduce energy and water waste when many draws are spaced moderately close together. Tables were provided for lengths of various pipes that would equal various water heater standby losses in order to decide when installing two water heaters may make sense. This paper concluded that

using multiple water heaters may be desirable compared to both large recirculation loop systems and non-recirculation applications.

Review comments: The report demonstrates the heat loss mechanisms from domestic piping systems and the effect on energy loss in the hot water system. The study is not designed to estimate the heat loss from piping systems in residential buildings using standard hot water use profiles and standard plumbing system designs.

Hiller, Carl C. 2006. "Hot Water Distribution System Piping Heat Loss Factors - Phase I Test Results." *ASHRAE Transactions* Vol. 112(2):436-446.

This paper reports on the laboratory testing of piping heat loss for PEX-aluminum-PEX (PAX) hot water piping under a variety of different temperature and flow conditions, including no flow, with various insulation levels and compares the results to previous test results on rigid copper pipe. The tests resulted in calculated piping heat loss factors for several commonly used pipe sizes, and examples are provided to show how to use this information to calculate energy losses.

Stewart, William E. Jr., Charles K. Saunders, and Carol L.G. Dona. 1999. "Evaluation of Service Hot Water Distribution System Losses in Residential and Commercial Installations: Part 1 – Field / Laboratory Experiments and Simulation Model." Report 4249 (RP-696) *ASHRAE Transactions* V. 105, Pt.1:1-10.

Laboratory and field experiments were performed to determine heat loss in various piping systems and a numerical model was developed to simulate heat loss. The simulation is considered more accurate and useful and the experiments were used as a comparison to the simulation results. The simulation method included pipe insulation as an input variable. Simulation results were given in a companion paper.

Wiehagen, J., and J.L. Sikora. 2003. *Performance Comparison of Residential Hot Water Systems*. NAHB Research Center Report NREL/SR-550-32922

The goals of this research project were to conduct laboratory testing to validate hot water energy savings estimated by prior simulations, measure energy performance of tank versus demand water heater and tree-type copper piping versus PEX parallel piping, and use updated software to evaluate different hot water system designs. The simulation model was calibrated with heat-transfer coefficients determined by experimental results. Simulations showed energy savings of 14%-34% for an electric demand heater with parallel piping compared to an electric storage tank heater and standard copper piping; a parallel piping system represented a and 6%-13% energy savings when modeled with either a tank or demand heater. A point of use system consisting of multiple demand heaters modeled 28%-50% energy savings compared to a storage tank heater with tree-type distribution piping. Additionally, reductions in water use associated with improving the energy efficiency of a hot water system may be significant. This study concludes that demand water heaters with a parallel piping distribution system are the most efficient of the systems evaluated, and recommends further evaluation of actual installation

costs and field performance data for the systems that are identified in this report as energy efficient and cost effective.

Cheng, Cheng-Li, Meng-Chieh Lee, and Yen-Hsun Lin. 2006. "Empirical Prediction Method of Transmission Heat Loss in Hot Water Plumbing." Energy and Buildings 38: 1220-1229.

The purpose of this paper was to present a simplified theoretical calculation of transmission heat loss in hot water piping. The study investigated different pipe materials, with and without insulation, typically found in Taiwan. Results were verified by comparing empirical data and theoretical calculations. This paper concluded that transmission heat loss in hot water piping is an important factor when estimating hot water energy consumption and that this simplified calculation method is an accurate approach.

Lutz, James. 2005. *Estimating Energy and Water Losses in Residential Hot Water Distribution Systems.* Lawrence Berkeley National Laboratory paper LBNL-57199.

This research investigated energy and water losses in residential domestic hot water distribution systems. Three types of loss were identified: the waste of water while waiting for hot water at the point of use, waste heat as water cools down after a draw, and the energy used to reheat water that was already heated once before. Shower losses, sink losses, and dishwasher losses were estimated based on the Residential End Uses of Water Study report (Mayer 1999) and various usage assumptions. Results estimated an average of 6.35 gallons per day is wasted while waiting for hot water and 10.9 gallons per day of wasted hot water that was heated but either not used or used after it has cooled off. This paper concluded that approximately 20% of total hot water use in single-family residences appears to be wasted.

Klein, Gary. 2005. "National Impact of Hot Water Distribution System Losses in Residences." Report DE-05-1-3 *ASHRAE Transactions,* Volume III, Part 2: 423-429.

The purpose of this paper was to assess whether or not the waste of energy and water associated with the poor design and installation of residential hot water distribution systems is large enough to warrant further study and remedial actions. The research estimated the average water wasted and associated costs for showers, long faucet draws, and short faucet draws (energy loss but no water loss). The study recognized losses associated with water heater set point temperatures raised to overcome piping losses, multi-family recirculation system losses, and that there is a large variation in waste based on usage patterns and distribution design (longer or shorter runs and proximity to water heater). This paper concluded that average daily household hot water waste is at least 10 gallons per day, resulting in very large national water and energy losses that appear to be growing and therefore recommended further study of how to cost-effectively reduce this waste for new construction.

Mishustin, V.I. and Yu. A. Chistyakov. 2003. "Thermophysical Measurements: Procedure for Determining Heat Losses Through the Insulation of Hot-Water Pipes." *Measurement Techniques* vol. 46, no. 9: 880-885. (Translated from Izmeritel'naay Teknika, No. 9,

pp. 47-51, September, 2003. Original article submitted April 26, 2003)

This paper described a procedure to determine steady-state heat losses through the insulation of inaccessible pipes of heating systems.

Energy Saving Potential Through Optimal Pipe Insulation. Armacell Engineered Foams

Technical article and study by the manufacturer investigated the energy savings of insulating heating and hot water pipes. The study was based on calculated piping heat losses, for heating and domestic hot water piping, of a single family house located in six different European countries. The study concluded that pipe insulation significantly reduces energy use, non-recoverable heat losses occur even on pipes in conditioned space, and the vast majority of non-recoverable heat losses are due to heat losses from domestic hot water pipes in summer.

Masiello, John A. and Danny S. Parker. "Factors Influencing Water Heating Energy Use and Peak Demand in a Large Scale Residential Monitoring Study." *Residential Buildings: Technologies, Design, Performance Analysis, and Building Industry Trends:* 1.157-1.170.

This paper evaluated various factors affecting water heating energy efficiency based on a utility research project that monitored 171 residences in Central Florida. Reported factors included hot water electric demand, day of week and seasonality variations, water heater types, element size, and tank wrap insulation, but did not include hot water pipe insulation.

Studies relevant to hot water use profiles in homes

Hendron, Robert, and Jay Burch. Draft 1/17/2007. *Development of Standardized Domestic Hot Water Event Schedules for Residential Buildings*. Report ES2007-36104, National Renewable Energy Laboratory Proceedings of Energy Sustainability 2007.

The purpose of this study was to use published data of hot water events to develop standard event schedules for the Building America Benchmark performance analysis. Drivers of domestic hot water events were identified as occupant behavior (most important), number of occupants (approximately linear), mains temperature, and magnitude of hot water distribution losses (very important); seasonality was not addressed by this study. Limitations were identified: the use of 6-minute time-steps for events (NREL planned to release another set of event schedules using 1-minute time-steps); increased energy loss using recirculation and other than standard trunk-and-branch systems; ENERGY STAR or other non-standard appliances may consume very different amounts of hot water; differences among households may not be consistent with typical family usage; conditional probability of events were not considered. NREL developed a series of residential hot water event schedules for sinks, showers, baths, clothes washer, and dishwasher.

Jordan, Ulrike and Klaus Vajen. 2005. *DHWcalc: Program to Generate Domestic Hot Water Profiles with Statistical Means for User Defined Conditions.* Proc. ISES Solar World Congress, Orlando 2005.

This report describes a program designed to generate domestic hot water profiles that are used primarily for annual system simulations. The program can be downloaded free of charge at: www.solar.uni-kassel.de.

DeOreo, William B. and Peter W. Mayer. *The End Uses of Hot Water in Single Family Homes from Flow Trace Analysis*. Aquacraft, Inc. Water Engineering and Management, Boulder, CO.

This paper explained how simultaneous flow trace data, from the main water meter and a meter installed at the feed line to the hot water tank, were used with specialized software to characterize hot water demand according to end use and presented results from ten homes tested in Seattle over 14 days. Results showed hot water end use statistics for baths, dishwashers, showers, faucets, and clothes washers, as well as household and per capita hot water use. This paper concluded that this method is an accurate and efficient method to collect data without the need for thermocouples or other devices, in order to provide detailed information on demand patterns useful to accurately design advanced hot water systems.

"Home and Outdoor Living Water Requirements, Plumbing Fixture and Appliance Water Flow Rates." *USDA Water Systems Handbook*. February 14, 2007 http://www.inspect-ny.com/septic/wateruse.htm

Table of usage requirements and typical fixture flow rates for U.S. homes and outdoor living.

Other related research

Aquilar, C., D.J. White, and David L. Ryan. April 2005. *Domestic Water Heating and Water Heater Energy Consumption in Canada*. Canadian Building Energy End-Use Data and Analysis Centre report CBEEDAC 2005-RP0, available at: http://www.ualberta.ca/~cbeedac/publications/documents/domwater_000.pdf

The purpose of this study was to review literature and technology for domestic water heating energy consumption that was estimated to be approximately 22% of total household energy consumption in Canada. Areas investigated included water heater types and efficiencies, factors influencing hot water usage and energy consumption, and energy modeling.

Mayer, Peter W., William B. DeOreo, Erin Towler, and David M. Lewis. July 2003. *Residential Indoor Water Conservation Study: Evaluation of High Efficiency Indoor Plumbing Fixture Retrofits in Single-Family Homes in the East Bay Municipal Utility District Service Area.* Aquacraft, Inc. Water Engineering and Management, Boulder, CO.

This study measured the impact of a variety of indoor water conservation measures for the EBMUD publicly owned utility in California. The methodology used was to collect two weeks of baseline water use data from 33 homes, retrofitting these homes with high efficiency toilets,

clothes washers, showerheads, and faucets; next two weeks of flow trace data were collected on two different occasions. Results included a 35% reduction in total water usage; 88% of this savings was the result of three end uses: toilets, clothes washers, and leaks. Ten of the 33 homes had water meters installed on the water heaters and showed in the post-retrofit period that 30% of all water used indoors was hot water and that on a daily basis 83% of that hot water was used for faucets, showers, and baths. This study concluded that significant indoor water savings can be achieved by the installation of high efficiency fixtures and appliances and that these products pay for themselves within the expected life spans.

"Sizing of Water Piping System" *2003 International Plumbing Code* 2003: 118-119.

Wiehagen, J. March 2007. *Domestic Hot Water System Research System Design for Efficiency and Performance.* NAHB Research Center report prepared for National Renewable Energy Laboratory.

This study was a preliminary investigation of a high performance (high energy and water efficiency while delivering a satisfactory amount of hot water) hybrid water heating system design. Previous research of hot water equipment and distribution systems including various piping layout and materials, piping energy loss, and effects of piping insulation were reviewed. A systems approach was identified to examine all aspects of a high performance design that considers preheating, efficiency, delivering hot water quickly, providing sufficient capacity, and minimizing the amount of wasted water and energy. The hybrid solution is a centrally located storage water heater combined with multiple, small capacity distributed water heaters. Simulated results lead to the conclusion that such a hybrid system has the potential to deliver more hot water, more quickly, and more efficiently that a tank-only system. Additional simulations and field studies to continue the evaluation of hybrid hot water systems were recommended.

Davis Energy Group. March 21, 2006. *Field Survey Report: Documentation of Hot Water Distribution Systems in Sixty New California Production Homes.* Report for Lawrence Berkeley National Laboratory.

This field survey was completed to better understand how hot water distribution systems (HWDS) are being installed in California production homes. The methodology investigated 60 single family houses statewide and four HWDS types (conventional trunk and branch using copper or PEX, PEX parallel-manifold, hybrid, and recirculation systems). Results quantified site characteristics, pipe characteristics, plumbing layout, type of water heater, fixture characteristics, industry trends, installation practices, and gathered anecdotal feedback. Specific conclusions and recommendations were made for the four HWDS types, notably with respect to excessive pipe length.

2009 & 2012 IECC Energy Simulation Results for Climate Zone 5

Prepared for

Coalition for Fair Energy Codes

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Disclaimer

Contents

Purpose

The purpose of this report is to 1) evaluate the 2009 and 2012 International Energy Conservation Code (IECC) and determine a percent energy savings over a 2006 IECC baseline, 2) determine construction cost reductions to the 2012 IECC when trading off expensive envelope code changes against cost-effective high efficiency equipment in climate zone 5.

Background

A strong push has been made by many advocacy groups, including the U. S. Department of Energy (DOE), to increase the stringency of the last two editions of the International Energy Conservation Code (IECC). This effort resulted in a number of major changes which impact both energy savings and construction costs for residential construction. This report will evaluate energy usage and the incremental cost of compliance for an average home constructed to the 2009 and 2012 IECC.

In addition, a change was made in the 2009 IECC which prevented equipment efficiency from being considered as an energy neutral trade-off. Consequently, the ability for builders or designers to cost optimize a building to achieve energy equivalent performance was removed. This analysis quantifies the consumer benefit for providing the option to include equipment efficiency when determining energy code compliance.

Methodology

The methodology employed in this analysis was patterned after an analysis done by DOE and the Pacific Northwest National Labs (PNNL)(Taylor (2010). Some assumptions and estimations were made to their analysis methodology when performing this analysis. Details related to the methodology employed in this analysis can be found in the *APA Simulation Background and Instructions* (Drumheller 2011) white paper.

For clarification, the resulting savings calculations are strictly a best effort to replicate the DOE/PNNL methodology. This is not an endorsement of said methodology, merely utilization of what might be considered by some to be a 3rd party unbiased approach.

Reference Home/Simulation File

A reference home, 2,400 square foot (above grade) with a conditioned basement, was developed by PNNL/DOE (Taylor 20120) which also included specific characteristics that were ultimately incorporated into a simulation file. PNNL/DOE used DOE-2 as their energy analysis program. For the purposes of this analysis, REM/Rate was used to compare the various versions of the IECC. REM/Rate was selected because of the wide availability of users (the majority of HERS raters), which will allow for many others to duplicate this process.

Representative City

The analysis was based on a house located in Columbus, OH which can be considered a representative location in climate zone 5A. Columbus is has 5,692 annual Heating Degree Days (HDD), and 7,490 Cooling Degree Hours (CDH) which is on the lower end of the climate zone 5 range (between 5,400-7,200 HDD).

Model Calibration

The PNNL/DOE analysis did not include a simulation for Columbus, Ohio. Consequently, to make a calibrated comparison between the two models, the same baseline home created in REM needed to be simulated in Chicago (the climate zone 5 city where PNNL/DOE results were available). The difference in heating, cooling and water heating energy use was only 1.1% ($21/yr). This calibration indicates that the base REM model used in this analysis is nearly identical to the PNNL/DOE model and would be expected to have similar results if there was a PNNL/DOE simulation run in Columbus.

Energy Simulation Variables

Table 1 lists the components which are changed in the simulations. Modified values (when moving left to right) are indicated with a black background.

Component	2006 IECC	2009 IECC	2012 IECC	2012 IECC w/Equipment
Fenestration U-Factor	0.35	0.35	0.32	0.30
Skylight U-Factor	0.60	0.60	0.55	0.55
Ceiling R-Value	38	38	49	38
Wood Frame Wall R-Value	19 or 13+5	20 or 13+5	20 or 13+5	19 or 13+5
Basement Wall R-Value	10/13	10/13	15/19	10/13
Crawl Space Wall R-Value	10/13	10/13	15/19	15/19
Duct Tightness (DSE)/% Adjustment	NR-(0.80)	8%	12%	12%
Building Tightness (ACH50)	NR-7	7	3	4
High Efficacy Lighting	NR-10%	50%	75%	75%
Furnace Efficiency (AFUE)	78%	78%	78%	94%
Hot Water Pipe Insulation	NR	NR	R-3	NR
Hot Water Energy Savings	0%	0%	10%	0%
Mechancial Ventilation (Y/NR)/Cost	NR	NR	Y/$80	Y/$80

NR- No Requirement

DSE- Distribution System Efficiency

Table 1: Simulation Model Variables

Results

Load	2006 IECC	Annual Energy Cost ($) 2009 IECC		2012 IECC		2012 IECC w/Equipment	
Heating	987	911		598		572	
Cooling	272	272		295		286	
Water Heating	267	267		267		267	
Light and Misc Loads	1,087	1,087		1,087		1,087	
Light and Misc Loads	1,087	1,087		1,087		1,087	
HCW Sub Total	1,526	1,450		1,160		1,125	
Total	2,613	2,537		2,247		2,212	
Sub total $/% savings over 2006 IECC code		$ 76	5.0%	$ 366	24.0%	$ 401	26.3%
Post Processing Adjustments							
Duct Tightness Savings (8, 10, 12%)		$ 95		$ 107		$ 103	
Addition of Piping Insulation (10%)[1]				$ 27			
Mechanical Ventilation (Penalty)				$ (80)		$ (80)	
Adjusted total $/% savings over 2006 IECC code		$ 171	11.2%	$ 420	27.5%	$ 424	27.8%

Table 2: Annual Energy Savings by Code

2012 IECC Energy Neutral Cost Savings Using High Efficiency Equipment

Item	Change	Unit Cost	Units	Cost	Source
Reductions					
Infiltration	3->4 ACH50	$ 0.15	2940	$430.92	ASHRAE 1481-RP
Hot Water Pipe Insulation[1]	Required->None	$ 829	1	$829.00	Faithful & Gould
Ceiling Insulation (Flat-70%)	R-49->R-38	$ 0.67	840	$558.78	ASHRAE 1481-RP
Ceiling Insulation (Cathedral-30%)[2]	R-49->R-38	$ 0.94	360	$336.89	ASHRAE 1481-RP
Wall Insulation	R-20->R-19	$ 0.19	2380	$456.18	ASHRAE 1481-RP
Basement Insulation	R-15->R-10	$ 0.56	1120	$631.39	ASHRAE 1481-RP
				$3,243.17	
Increases					
Furnace Efficiency	0.78->0.94 AFUE	$ 1,504	1	$1,504.07	ASHRAE 1481-RP
Window U-Factor	0.32->0.30 U	$ 0.34	357	$121.38	ASHRAE 90.1 Env
				$1,625.45	
Cost Totals					
Reduction for non cost effective changes				$3,243.17	
Increase for more cost effective changes				$1,625.45	
Net Reduction using equipment efficiency as energy neutral trade-off				**$1,617.73**	

[1] Assume 98ft of 1/2" pipe insulation and 80ft of 3/4" pipe insulation

[2] Does not include reduction for downsizing roof rafter

Note: ASHRAE 1481-RP (2008) Prices have been escilated for inflation by 12.7% (RS Means)

Table 3: Construction Savings Using Equipment Efficiency for the 2012 IECC

Discussion

Energy savings of over 11% should be realized with adoption of the 2009 IECC over the 2006 IECC (does not include high efficacy lighting energy savings)(Table 2).

The 2012 IECC is estimated to save 27.5% (Table 2); this does not include savings associated with high efficacy lighting and additionally penalizes the savings (5 percentage points) by adding ventilation to the 2012 requirements which was not included in the 2006 IECC analysis.

Table 3 is an example of the potential construction cost savings if higher efficiency equipment is considered for energy code compliance. This example results in a construction cost reduction of $1,617 in climate zone 5. An optimized solution would result in additional construction cost savings while yielding the same or less energy consumption.

References

ASHRAE 90.1 Envelope Subcommittee Cost Database

Building America (2010), Cost Database for BEopt Energy Simulations, National Renewable Energy Lab, Golden, CO.

Drumheller, C, (2011), *APA Simulation Background and Instructions*, NAHB Research Center, Upper Marlboro, MD.

Faithful & Gould (2012), *Residential Energy Efficiency Measures Prototype Estimate and Cost Data*, For Pacific Northwest National Lab, Richland, WA.

International Code Council (ICC). (2006). International Energy Conservation Code 2006. Falls Church, VA: ICC

International Code Council (ICC). (2009). International Energy Conservation Code 2009. Falls Church, VA: ICC

International Code Council (ICC). (2011). International Energy Conservation Code 2012. Falls Church, VA: ICC

Taylor, Z.T., Lucas, R.G., (2010-1) *An Estimate of Residential Energy Savings From IECC Change Proposals Recommended for Approval at the ICC's Fall, 2009, Initial Action Hearings,* PNNL-19367, Richland WA: Pacific Northwest National Laboratory.

Taylor, Z.T. (2010-2) The Evolving Relationship Between Energy Codes, Beyond-Code Programs, and Home Energy Ratings, 2010 RESNET Conference, Slide 21 of 42
http://www.hersindex.com/conference/2010/presentations/Taylor.pdf

Amendment E

Recommended State & Local Amendments to the 2012 International Building Code (IBC)

Issue: Window Sill Height

2012 IBC Section Number: 1013.8

Recommended Amendment:
Delete the portion of the code and replace as shown below:

1013.8 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than 18 inches (457mm) ~~36 inches (610 mm)~~ above the finished floor surface of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102mm) sphere where such openings are located within 18 inches (457mm) ~~36 inches (915mm)~~ of the finished floor
Remainder left unchanged

Reason:
~~The 2012 International Residential Code does not require window guards for windows with a sill height greater than 24 inches off of the finish floor.~~ The International Building Code requires the installation of windows guards on windows with a sill height less than 36 inches off of the finished floor. During the 2009-10 code development cycle, the IRC-BE committee disapproved a similar proposal to raise the window sill height to 36 inches and the committees decision was upheld at the final action hearing. A similar public comment to raise the window sill height to 36 inches also failed to pass the final assembly.

For the many years the debate for requiring fall protection devices the most contentious issue has been the height of the window sill in which the device should be required. The Building Industry agrees with many of the concerns that were raised by the opponents of the proposal. By raising the window sill height requirement to 36 inches there is the potential for unintended consequences as it may cause children to prop items or move furniture to allow them to see over the window sill which is no longer below their field of vision.

Many of the children safety advocates focus their efforts to relay safety messages to parents regarding the prevention of falls by recommending that windows should be closed in rooms where children are playing, where children are unsupervised, avoid placing furniture near windows and if windows are going to be left open, open them from the top down.

Table 1 - Factors Affecting Hot Water System Energy Use

Property	Energy Use Mechanism	Loss Consequence
Pipe material, length and location	Heat transfer through the pipe to the surrounding based on conductivity and the environmental temperature around the pipe	• Energy loss during flow • Energy loss at the end of the flow event (cool down) • Water loss waiting for hot water at the outlet
Intention of use	Volume of hot water in the piping based on a desired temperature (i.e. shower) or fixed volume (i.e. dishwasher)	• Water waste waiting for hot water at the outlet • Increase in water heating energy based on the need for hotter water at the outlet
Flow rate	Heat transfer through the pipe to the surrounding during use	Magnitude of loss relative to total volume of use increases with a decrease in flow rates
Interval between use	Heat loss during pipe cool down after a use event	Energy and water loss dependent on the time to the subsequent use
Cold water temperature at the outlet	Volume of hot water used dependent on the desired temperature at the outlet, if set	Larger volume of hot water is used with colder incoming water temperature

As outlined, the confluence of parameters involved in the determination of hot water system losses increases the complexity of determining the affect of any one aspect leading to higher energy losses relative to the total energy use in the hot water system. This affect is clearly seen in the energy factor (EF) rating for water heaters which is highly dependent on the time frame and use pattern of the test procedure. For any actual home, the EF may be significantly different from the equipment rating, for example, in homes where there is large hot water use throughout the day, the actual EF may be much higher, where the opposite would be true for homes that use much less hot water than the test procedure.

Furthermore, the losses from the hot water system are all relative to the total energy supplied to the hot water system such that homes with low hot water use due to consumer behavior (including the choice of low-flow faucets) may reduce the total energy used in the hot water system, the ultimate benefit desired. However, in all homes, the performance of the hot water system may be improved (e.g. faster hot water delivery, lower piping losses, etc.) through the system design.

This study focuses on one aspect of the system design – insulating hot water piping as a means to reduce energy (and corresponding water) losses. It must be noted that this study did not evaluate recirculation systems which presents a different set of analysis complexities including the type of recirculation system, the actual layout of the system, the pumping energy, and the control mechanisms based on occupant behavior at a particular use point.

Published Hot Water Energy Use Research

A literature search was performed to review the current information available relating to hot water energy use in homes and specifically concerning the application of insulation for the piping. The relevant literature is annotated in Appendix A. Few studies specifically focused on pipe losses from domestic hot water systems. The most significant studies were published in 2004 [Baskin et. El. 2004] through 2006 [Hiller] that used analytical and some laboratory test methods to demonstrate the scope of losses from domestic hot water piping. These studies, while not applied to realistic hot water use

OFFICE OF THE COUNTY EXECUTIVE
ROCKVILLE, MARYLAND 20850

Isiah Leggett
County Executive

MEMORANDUM

TO: Roger Berliner, President
Montgomery County Council

FROM: Isiah Leggett, County Executive

SUBJECT: Executive Regulation 9-12, Fire Safety Code – Fire Protection Systems

The purpose of this memorandum is to transmit Executive Regulation 9-12, "Fire Safety Code – Fire Protection Systems," for review and consideration by the County Council. Executive Regulation 9-12 adopts and modifies certain standards published by the National Fire Protection Association (NFPA) involved with the installation, testing, and maintenance of certain fire protection systems as required by the Montgomery County Building Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code.

The Department of Permitting Services has been delegated the authority by the Fire Chief of Montgomery County Fire and Rescue Services to adopt regulations pursuant to Chapter 22 of the Montgomery County Code in the cases of a new building, a new system, or new conditions.

The regulation was advertised in the April 2012 issue of the Montgomery County Register, no written comments were received. As advertised in the Montgomery County Register notice, a public hearing was held on April 18th, 2012. There were no speakers who offered comments during the hearing. If there are any questions, please call Hemal Mustafa at 240-777-6226.

Attachments

Fiscal Impact Statement
Executive Regulation 9-12, Fire Safety Code – Fire Protection Systems

1. **Executive Regulation Summary**

   This regulation adopts and modifies certain standards published by the National Fire Protection Association (NFPA) involved with the installation, testing, and maintenance of certain fire protection systems as required by the Montgomery County Building Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. The changes do not retroactively apply to unaltered existing buildings, existing systems or existing conditions permitted or approved before the date of adoption of this regulation.

2. **An estimate of changes in County revenues and expenditures regardless of whether the revenues or expenditures are assumed in the recommended or approved budget. Includes source of information, assumptions, and methodologies used.**

   There is no change in County revenues or expenditures due to this regulation. The regulation establishes the minimum level of performance for various fire safety or life safety systems.

3. **Revenue and expenditure estimates covering at least the next 6 fiscal years.**

   There are no revenues or expenditures associated with this regulation.

4. **An actuarial analysis through the entire amortization period for each regulation that would affect retiree pension or group insurance costs.**

   Not applicable.

5. **Later actions that may affect future revenue and expenditures if the regulation authorizes future spending.**

   Not applicable.

6. **An estimate of the staff time needed to implement the regulation.**

   Approximately 10 staff persons will need to attend an in-house training session or otherwise familiarize themselves with the requirements. The in-house training is not expected to last more than 4 hours.

7. **An explanation of how the addition of new staff responsibilities would affect other duties.**

   No staff is added as a result of this proposed regulation.

8. **An estimate of costs when an additional appropriation is needed.**

Not applicable.

9. **A description of any variable that could affect revenue and cost estimates.**

Not applicable.

10. **Ranges of revenue or expenditures that are uncertain or difficult to project.**

Not applicable.

11. **If a regulation is likely to have no fiscal impact, why that is the case.**

This regulation is an update to the construction standards applicable to Montgomery County. The regulation proposes no new fees nor generates additional expenditures.

12. **Other fiscal impacts or comments.**

Not applicable.

13. **The following contributed to and concurred with this analysis.**

Alicia Thomas, Department of Permitting Services
Amy Wilson, Office of Management and Budget

Jennifer A. Hughes, Director
Office of Management and Budget

3/21/12
Date

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS	Number: 9-12
Originating Department: DEPARTMENT OF PERMITTING SERVICES	Effective Date:

Montgomery County Regulation on:

FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS
Montgomery County Department of Permitting Services

Issued by: County Executive
Regulation No: 9 -12

Authority: Code Section 22-13
Supersedes: None
Council Review: Method 2 under Code Section 2A-15
Register Vol. 29, Issue 4
Comment Deadline: April 30, 2012
Effective date:
Sunset date: None

SUMMARY: This regulation adopts and modifies certain standards published by the National Fire Protection Association (NFPA) involved with the installation, testing and maintenance of certain fire protection systems as required by the Montgomery Country Building Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. The changes do not retroactively apply to unaltered existing buildings, existing systems or existing conditions permitted or approved before the date of adoption of this regulation.

The Department of Permitting Services has been delegated the authority by the Fire Chief (of Montgomery County Fire and Rescue Services) to adopt regulations pursuant to Chapter 22 of the Montgomery County Code in the cases of a new building, a new system, or new conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

ADDRESSES: Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, MD 20850

STAFF: For further information, contact Joseph Felton, Manager, Division of Building Construction, 240-777-6208.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS	Number: 9-12
Originating Department: DEPARTMENT OF PERMITTING SERVICES	Effective Date:

Sec. 1 In accordance with the procedures authorized in Chapter 22, "Fire Safety Code", of the Montgomery County Code, 1996, this Executive Regulation applies to the design, installation, and maintenance of fire protection systems in buildings or structures. Where there are differences between this regulation and the Montgomery County Building Code, the more restrictive provision(s) will apply.

In this regulation the term "Fire Chief" means the Fire Chief of the Montgomery County Fire and Rescue Service and includes the Fire Chief's designees.

The Department of Permitting Services has been delegated authority by the Fire Chief to enforce the requirements of the Montgomery County Fire Safety Code as it pertains to new facilities, elements, structures, and conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

Sec. 2 All references to the National Fire Codes and standards adopted in these regulations are to those codes, standards, recommended practices, and manuals in the National Fire Codes, published by the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. Unless otherwise noted, all references are to those codes and standards published in the 2009 edition of National Fire Protection Association's Fire Code (NFPA 1) and are adopted in their entirety.

Terms used in this regulation which are defined in the state adopted consensus codes shall have the definitions of the consensus code.

Sec. 3 Designs for smoke management systems shall be submitted for review and approval as part of a building permit. Submittals for smoke management systems shall include:

(a) Plans and specifications
(b) Engineering calculations and/or computer model
(c) Floor plans
(d) System diagrams and details
(e) Sequence of operations and control layout
(f) Preliminary test procedures
(g) Acceptance test procedures
(h) Pass/fail criteria
(i) Maintenance requirements including periodic testing criteria

Sec. 4 NFPA 13, paragraph 8.1.1, add new paragraph (8) as follows:

(8) Sprinklers are required under attached balconies or porches unless at least 50 percent of the longest exterior side is open to the atmosphere.

Sec. 5 NFPA 13, Section 8.3.2.4, add the following: "Intermediate temperature sprinkler heads shall only be installed if an acceptable layout can not be achieved without a sprinkler head in the high temperature area."

Sec. 6 NFPA 13, paragraph 8.4.5.1, add: Listed residential sprinkler heads shall be used in dwelling units except Detention and Correctional occupancies.

Sec. 7 NFPA 13, paragraph 8.15.7, add: Any canopy with the potential for extended vehicle standing or parking below shall have sprinkler protection on the underside of the canopy.

Sec. 8 NFPA 13, paragraph 8.15.14.1, add a sentence at the beginning that reads: For new ceiling installations, drop-out ceilings shall be prohibited.

Sec. 9 NFPA 13, paragraph 8.15.10.3 is deleted.

Sec. 10 NFPA 13, paragraph 8.15.19.1 is amended as follows: In new installations expected to supply sprinklers below a ceiling and in any speculative areas subject to tenant changes, minimum one inch sprinkler outlets shall be provided.

Sec. 11 NFPA 13, paragraphs 8.16.1.1.1 and 8.17.1.1, add: When a sprinkler system serves more than one level, each level must be consistently and separately valved by a listed and approved control valve. In addition, where a sprinkler system is required to activate a building fire alarm system, the sprinkler system shall have a separate and distinct water flow detecting device for each floor and zone.

Exception 1: In buildings not exceeding three floors and 3000 square feet per floor.
Exception 2: Unoccupied and unused attics may be zoned with the level below.
Exception 3: Mezzanines not exceeding 3000 square feet in area.
Exception 4: Detention and correctional facilities.

Sec. 12 NFPA 13, paragraph 8.17.2, add the following requirements for fire department connections:

(a) Shall be located within 100 feet from a fire hydrant, and between 18 and 48 inches from grade to the centerline of the inlets.

(b) Number of 2 1/2 in. inlets:

System Demand (gpm)	No. of Inlets
up to 749	2
750-999	3
1000 and above	4

(c) Multiple connections for the same building shall be interconnected.

(d) When a section of a building is fed by a connection (i.e., partial systems), permanent all weather identification signs shall be provided on connections.

(e) Shall be sized at least as large as the main sprinkler system riser pipe or the fire pump discharge line, whichever is larger.

Sec. 13 NFPA 13, paragraph 11.1, add: Calculations for new systems or new portions of systems shall meet the criteria below.

(a) Highest hazard and most demanding use allowed by building construction permit or property zoning.

(b) Storage use: Available storage height for high storage of a class 4 non-encapsulated material.

(c) Laboratory use: ordinary group 2 for class A, B, or C labs.

(d) All uses: 20% safety factor. For systems without a pump, this is based on the demand pressure only at the supply point. For systems with a pump, this is based on both the demand pressure and demand flow at the pump discharge. All design options, except grids, must be explored.

Exception to safety factor only: Owner occupied buildings may use a lower safety factor if a pump would be necessary to achieve the 20%.

Sec. 14 NFPA 13, paragraph 23.1.2, add: Pressure and flow availability as determined by a hydraulic information sheet received from a public utility shall be used for new taps. Pressure and flow availability for existing taps shall be determined by an interior flow test. In any case, the supply information shall be corrected for the low hydraulic gradient. Fire pumps and fire pump/tank supplies shall only be used where it is demonstrated that the public water supply is inadequate.

Sec. 15 NFPA 13, paragraph 24.2.1. Add a new paragraph:

24.2.1.13 Sprinkler heads shall not be installed in plastic pipe until after the hydrostatic test is passed.

Sec. 16 NFPA 13D, paragraph 1.1, add: This standard also applies to Day care homes containing 12 clients or less if located within converted one and two family dwellings or townhouses.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS	Number: 9-12
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Sec. 17 NFPA 13D, paragraph 4.3. Add a new paragraph:

4.3.3 Sprinkler heads shall not be installed in plastic pipe until after the hydrostatic test is passed.

Sec. 18 NFPA 13D, paragraph 6.1, add: Pressure and flow availability as determined by a public utility must be used and shall be adjusted to the low hydraulic gradient. Booster pumps and pump/tank supplies shall only be used where it is demonstrated that the public water supply is inadequate as determined by the director of the Department of Permitting Services.

Sec. 19 NFPA 13D, paragraph 6.2: Add section (6)

(6) System specific data plate on durable material to be fixed at sprinkler system main riser.

Sec. 20 NFPA 13D, paragraph 6.2.2(6), add to the end of the sentence "and shall be raised a minimum of 1 ½ inches of the floor."

Sec. 21 NFPA 13D, section 7.5.5.1, add: Where possible to maintain listed coverage, sprinkler heads shall be positioned so as to eliminate the need to install sprinkler heads of a higher temperature rating.

Sec. 22 NFPA 13D, paragraph 7.5.5, add new paragraph 7.5.5.4:

7.5.5.4 Dry type sprinklers shall be used in areas which are not heated to at least 40 degrees F.

Sec. 23 NFPA 13D, paragraph 8.2.5, add paragraph 8.2.5.1.1:

8.2.5.1.1 Sprinkler heads in closets shall not be located directly above shelves.

Sec. 24 NFPA 13D, paragraph 8.4, add: All calculations shall include at least a 10% safety factor to account for minor field changes, unless a booster pump is necessary to obtain this safety factor.

Sec. 25 NFPA 13D, paragraph 8.6.4, add the following after garages: "...unless located partially or wholly beneath living space."

Sec. 26 NFPA 13R, paragraph 6.4.2. Add a new paragraph:

6.4.2.3 Sprinkler heads shall not be installed in plastic pipe until after the hydrostatic test is passed.

MONTGOMERY COUNTY EXECUTIVE REGULATION

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Sec. 27 NFPA 13R, paragraph 6.6.3, add: Pressure and volume availability as determined by a public utility shall be used and shall be adjusted to the low hydraulic gradient. Booster pumps and pump/tank supplies shall only be used where it is demonstrated that the public water supply is inadequate.

Sec. 28 NFPA 13R, paragraph 6.7.4.2 is replaced to read: "The fire department connection shall be a minimum of one 2 ½ inch inlet with a feed line sized at least as large as the main system riser. The fire department connection shall be located on a fire department access road and be 18 to 48 inches from the centerline of the inlet to finish grade."

Sec. 29 NFPA 13R, paragraph 6.8.1.5.3.2 is amended to add subparagraph (e):

(e) Sprinkler heads in closets shall not be located directly above shelves.

Sec. 30 NFPA 13R, paragraph 6.8.1.5.3.3 is amended to add subparagraph (e):

(e) Unprotected bulkheads or soffits behind the spray of side wall sprinklers shall not exceed 8 inches in width for residential sidewalls and 12 inches for dry sidewalls.

Sec. 31 NFPA 13R, paragraph 6.8.4, add: All calculations shall include at least a 10% safety factor to account for minor field changes, unless a listed fire pump is necessary to obtain this safety factor.

Sec. 32 NFPA 14, paragraph 4.7.2 is amended as follows: Each fire hose valve shall be provided with 2 1/2 in. hose connection, 2 1/2 in. to 1 1/2 in. reducer, cap, and chain.

Sec. 33 NFPA 14, paragraph 5.1.2, add:

(1) Systems shall be automatic wet type.
(2) Standpipe systems in unheated areas shall be automatic dry type.
(3) Standpipe systems in detached open parking garages may be the manual dry type, if the piping is air supervised for breaks or open valves.
(4) Occupant use hose is prohibited in new or existing buildings.
(5) New standpipe systems shall be Class I only.

Sec. 34 NFPA 14, paragraph 6.4 (Fire Department Connections), add:

(1) Number of 2 1/2 in. inlets:

System Demand (gpm)	No. of Inlets

up to 749	2
750-999	3
1,000 and above	4

(2) Multiple connections on the same building shall be interconnected.
(3) When a section of a building is fed by a connection (i.e., partial systems), permanent all weather identification signs shall be provided on connections.

Sec. 35 NFPA 14, paragraph 7.3.2(1), amend to read:

"At the highest intermediate landing between floor levels or each main landing in every required exit stairway."

Sec. 36 NFPA 14, paragraph 7.3.2.3, add:

(1) Measurement shall be parallel or at right angles to walls.
(2) Supplemental hose valves outside the stairs shall not be located within tenant spaces, unless hose reach requirements cannot be met by placement of valves in public corridors or by use of wall hydrants for spaces opening to the exterior. Hose valve locations shall be marked by the placement of signs, the striping of columns, or other approved methods.

Sec. 37 NFPA 14, paragraph 7.8.1.1, add exceptions:

Exception 1: In high-rise buildings, where booster pumps are necessary to produce the required residual pressures, pumps and piping systems must be sized to provide for the demand of the hydraulically most remote hose station, or the sprinkler system demand, whichever is greater. The standpipe system must also be sized to provide the required flow and pressure for all hose stations required to be flowing, when supplied by 150 psi at 1000 gpm at the fire department connection(s). Two sets of calculations will, therefore, be required under this exception.

Exception 2: Systems in buildings that are not high-rise, and dry systems with no automatic water supply, may be sized to obtain the required flows and pressures, when supplied by 150 psi at 1000 gpm at the fire department connection(s).

Exception 3: In existing buildings, after shell occupancy, hose valves added to correct reach

violations created by tenant modifications may be supplied by 3 inch pipe without recalculation.

Sec. 38 NFPA 20, paragraph 5.18.1.2, add: A relief valve shall be permitted to be installed to reduce operating pressure below 175 psi at high gradient.

Sec. 39 NFPA 20, paragraph 5.18.7 is amended entirely to state: For other than static water supplies, relief valves shall not be piped back into the source of the supply.

Sec. 40 NFPA 72, paragraph 4.4.6.1, add the following sentence: An annunciator with the following features is required when the building is greater than one story, over 20,000 square feet in area per floor, or has more than one type of alarm initiating device.

Exception 1: Apartments protected by a 13R sprinkler system.
Exception 2: Any building not exceeding two stories above grade and 3,000 square feet per floor.

(a) Annunciator shall have a visible signal for each different floor, zone, and device type. Supervised computer screen or printer type annunciators may be used to meet this requirement if the zone identification is approved by the Fire Chief.
(b) Unless otherwise approved by the authority having jurisdiction, zones shall not exceed a single floor, 20,000 square feet, or 300 linear feet. Sprinkler systems shall be permitted to be zoned in accordance with the applicable sprinkler standard.
(c) If two or more zones per floor are required, a graphic outline on or adjacent to the annunciator shall be provided showing the building outline, zone boundaries, "you are here" notation, north compass arrow, all stairways, stairway identification numbers, all standpipe risers, elevators, and the building address.
(d) A lamp type annunciator shall have a lamp test switch unless the annunciator circuits are supervised.
(e) The annunciator shall be located at, and visible from, the main fire department entrance unless the building has a fire command center.
(f) If two or more buildings are controlled by one alarm system, an annunciator shall be installed in each building with a pilot lamp indicating the building of alarm origination.

Sec. 41 NFPA 72, paragraph 5.7.3.2.3.3, add new paragraph 5.7.3.2.3.3.1:

5.7.3.2.3.3.1 Detectors which activate required extinguishing systems on a cross-zoned or multiple-zone basis shall be spaced at a maximum of one-half of their allowed or listed square footage spacing.

Sec. 42 NFPA 72, paragraph 5.7.4.2.2, add: Activation of duct smoke detectors shall sound an audible

alarm in a normally occupied area or through the building fire alarm system, and shall be identified as duct detector. Where connected to the building alarm, the signal shall be supervisory only and shall not initiate the building evacuation alarm unless a confirmation or verification feature is provided.

Sec. 43 NFPA 72, paragraph 5.7.1.7 is amended as follows: Detectors located at the top of shafts and stairs shall be on a supervisory circuit only unless a confirmation or verification feature is provided. The location shall be identified at the annunciator or fire alarm control panel.

Sec. 44 NFPA 72, paragraph 5.11.2, add: Standpipe or main water flow indicators, if provided, shall sound a supervisory signal only.

Sec. 45 NFPA 72, the second sentence under paragraph 5.13.4 is changed to read: "The center of each manual fire alarm pull station shall be between 42 and 48 inches above the floor level."

Sec. 46 NFPA 72, paragraph 5.13, is amended by adding subparagraph 5.13.9

5.13.9 When fire alarm systems are not monitored by a UL listed central station, an approved permanent sign shall be installed adjacent to each manual fire alarm box. The sign shall read as follows:

Local Alarm Only:

(1) Activate Alarm
(2) Exit Building
(3) Call Fire Department

Sec. 47 NFPA 72, paragraph 6.10.1.15 is amended by changing "two" to "six".

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS	Number: 9-12
Originating Department: DEPARTMENT OF PERMITTING SERVICES	Effective Date:

Sec. 48 NFPA 72, paragraph 11.8.3.5, add new paragraph (11):

(11) Enclosed rooms with a closet such as dens, libraries, studies, or sitting rooms which could be used as a sleeping area shall be treated as bedrooms.

Approved,

Isiah Leggett
County Executive

Approved as to form and legality
Montgomery County, Md. County Attorney's Office
By:

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS	**Number: 9-12**
Originating Department: DEPARTMENT OF PERMITTING SERVICES	**Effective Date:**

Montgomery County Regulation on:

FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS
Montgomery County Department of Permitting Services

Issued by: County Executive
Regulation No: 9-12

Authority: Code Section 22-13
Supersedes: None
Council Review: Method 2 under Code Section 2A-15
Register Vol. 29, Issue 4
Comment Deadline: April 30, 2012
Effective date:
Sunset date: None

SUMMARY: This regulation adopts and modifies certain standards published by the National Fire Protection Association (NFPA) involved with the installation, testing and maintenance of certain fire protection systems as required by the Montgomery Country Building Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. The changes do not retroactively apply to unaltered existing buildings, existing systems or existing conditions permitted or approved before the date of adoption of this regulation.

The Department of Permitting Services has been delegated the authority by the Fire Chief (of Montgomery County Fire and Rescue Services) to adopt regulations pursuant to Chapter 22 of the Montgomery County Code in the cases of a new building, a new system, or new conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

ADDRESSES: Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, MD 20850

STAFF: For further information, contact Joseph Felton, Manager, Division of Building Construction, 240-777-6208.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE - FIRE PROTECTION SYSTEMS	Number: 9-12
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Sec. 1 In accordance with the procedures authorized in Chapter 22, "Fire Safety Code", of the Montgomery County Code, 1996, this Executive Regulation applies to the design, installation, and maintenance of fire protection systems in buildings or structures. Where there are differences between this regulation and the Montgomery County Building Code, the more restrictive provision(s) will apply.

In this regulation the term "Fire Chief" means the Fire Chief of the Montgomery County Fire and Rescue Service and includes the Fire Chief's designees.

The Department of Permitting Services has been delegated authority by the Fire Chief to enforce the requirements of the Montgomery County Fire Safety Code as it pertains to new facilities, elements, structures, and conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

Sec. 2 All references to the National Fire Codes and standards adopted in these regulations are to those codes, standards, recommended practices, and manuals in the National Fire Codes, published by the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. Unless otherwise noted, all references are to those codes and standards published in the 2009 edition of National Fire Protection Association's Fire Code (NFPA 1) and are adopted in their entirety.

Terms used in this regulation which are defined in the state adopted consensus codes shall have the definitions of the consensus code.

Sec. 3 Designs for smoke management systems shall be submitted for review and approval as part of a building permit. Submittals for smoke management systems shall include:

(a) Plans and specifications
(b) Engineering calculations and/or computer model
(c) Floor plans
(d) System diagrams and details
(e) Sequence of operations and control layout
(f) Preliminary test procedures
(g) Acceptance test procedures
(h) Pass/fail criteria
(i) Maintenance requirements including periodic testing criteria

Sec. 4 NFPA 13, paragraph 8.1.1, add new paragraph (8) as follows:

(8) Sprinklers are required under attached balconies or porches unless at least 50 percent of the longest exterior side is open to the atmosphere.

Sec. 5 NFPA 13, Section 8.3.2.4, add the following: "Intermediate temperature sprinkler heads shall only be installed if an acceptable layout can not be achieved without a sprinkler head in the high temperature area."

Sec. 6 NFPA 13, paragraph 8.4.5.1, add: Listed residential sprinkler heads shall be used in dwelling units except Detention and Correctional occupancies.

Sec. 7 NFPA 13, paragraph 8.15.7, add: Any canopy with the potential for extended vehicle standing or parking below shall have sprinkler protection on the underside of the canopy.

Sec. 8 NFPA 13, paragraph 8.15.14.1, add a sentence at the beginning that reads: For new ceiling installations, drop-out ceilings shall be prohibited.

Sec. 9 NFPA 13, paragraph 8.15.10.3 is deleted.

Sec. 10 NFPA 13, paragraph 8.15.19.1 is amended as follows: In new installations expected to supply sprinklers below a ceiling and in any speculative areas subject to tenant changes, minimum one inch sprinkler outlets shall be provided.

Sec. 11 NFPA 13, paragraphs 8.16.1.1.1 and 8.17.1.1, add: When a sprinkler system serves more than one level, each level must be consistently and separately valved by a listed and approved control valve. In addition, where a sprinkler system is required to activate a building fire alarm system, the sprinkler system shall have a separate and distinct water flow detecting device for each floor and zone.

Exception 1: In buildings not exceeding three floors and 3000 square feet per floor.
Exception 2: Unoccupied and unused attics may be zoned with the level below.
Exception 3: Mezzanines not exceeding 3000 square feet in area.
Exception 4: Detention and correctional facilities.

Sec. 12 NFPA 13, paragraph 8.17.2, add the following requirements for fire department connections:

(a) Shall be located within 100 feet from a fire hydrant, and between 18 and 48 inches from grade to the centerline of the inlets.

(b) Number of 2 1/2 in. inlets:

System Demand (gpm)	No. of Inlets
up to 749	2
750-999	3
1000 and above	4

(c) Multiple connections for the same building shall be interconnected.

(d) When a section of a building is fed by a connection (i.e., partial systems), permanent all weather identification signs shall be provided on connections.

(e) Shall be sized at least as large as the main sprinkler system riser pipe or the fire pump discharge line, whichever is larger.

Sec. 13 NFPA 13, paragraph 11.1, add: Calculations for new systems or new portions of systems shall meet the criteria below.

(a) Highest hazard and most demanding use allowed by building construction permit or property zoning.

(b) Storage use: Available storage height for high storage of a class 4 non-encapsulated material.

(c) Laboratory use: ordinary group 2 for class A, B, or C labs.

(d) All uses: 20% safety factor. For systems without a pump, this is based on the demand pressure only at the supply point. For systems with a pump, this is based on both the demand pressure and demand flow at the pump discharge. All design options, except grids, must be explored.

Exception to safety factor only: Owner occupied buildings may use a lower safety factor if a pump would be necessary to achieve the 20%.

Sec. 14 NFPA 13, paragraph 23.1.2, add: Pressure and flow availability as determined by a hydraulic information sheet received from a public utility shall be used for new taps. Pressure and flow availability for existing taps shall be determined by an interior flow test. In any case, the supply information shall be corrected for the low hydraulic gradient. Fire pumps and fire pump/tank supplies shall only be used where it is demonstrated that the public water supply is inadequate.

Sec. 15 NFPA 13, paragraph 24.2.1. Add a new paragraph:

24.2.1.13 Sprinkler heads shall not be installed in plastic pipe until after the hydrostatic test is passed.

Sec. 16 NFPA 13D, paragraph 1.1, add: This standard also applies to Day care homes containing 12 clients or less if located within converted one and two family dwellings or townhouses.

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Sec. 17 NFPA 13D, paragraph 4.3. Add a new paragraph:

4.3.3 Sprinkler heads shall not be installed in plastic pipe until after the hydrostatic test is passed.

Sec. 18 NFPA 13D, paragraph 6.1, add: Pressure and flow availability as determined by a public utility must be used and shall be adjusted to the low hydraulic gradient. Booster pumps and pump/tank supplies shall only be used where it is demonstrated that the public water supply is inadequate as determined by the director of the Department of Permitting Services.

Sec. 19 NFPA 13D, paragraph 6.2: Add section (6)

(6) System specific data plate on durable material to be fixed at sprinkler system main riser.

Sec. 20 NFPA 13D, paragraph 6.2.2(6), add to the end of the sentence "and shall be raised a minimum of 1 ½ inches of the floor."

Sec. 21 NFPA 13D, section 7.5.5.1, add: Where possible to maintain listed coverage, sprinkler heads shall be positioned so as to eliminate the need to install sprinkler heads of a higher temperature rating.

Sec. 22 NFPA 13D, paragraph 7.5.5, add new paragraph 7.5.5.4:

7.5.5.4 Dry type sprinklers shall be used in areas which are not heated to at least 40 degrees F.

Sec. 23 NFPA 13D, paragraph 8.2.5, add paragraph 8.2.5.1.1:

8.2.5.1.1 Sprinkler heads in closets shall not be located directly above shelves.

Sec. 24 NFPA 13D, paragraph 8.4, add: All calculations shall include at least a 10% safety factor to account for minor field changes, unless a booster pump is necessary to obtain this safety factor.

Sec. 25 NFPA 13D, paragraph 8.6.4, add the following after garages: "...unless located partially or wholly beneath living space."

Sec. 26 NFPA 13R, paragraph 6.4.2. Add a new paragraph:

6.4.2.3 Sprinkler heads shall not be installed in plastic pipe until after the hydrostatic test is passed.

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Sec. 27 NFPA 13R, paragraph 6.6.3, add: Pressure and volume availability as determined by a public utility shall be used and shall be adjusted to the low hydraulic gradient. Booster pumps and pump/tank supplies shall only be used where it is demonstrated that the public water supply is inadequate.

Sec. 28 NFPA 13R, paragraph 6.7.4.2 is replaced to read: "The fire department connection shall be a minimum of one 2 ½ inch inlet with a feed line sized at least as large as the main system riser. The fire department connection shall be located on a fire department access road and be 18 to 48 inches from the centerline of the inlet to finish grade."

Sec. 29 NFPA 13R, paragraph 6.8.1.5.3.2 is amended to add subparagraph (e):

(e) Sprinkler heads in closets shall not be located directly above shelves.

Sec. 30 NFPA 13R, paragraph 6.8.1.5.3.3 is amended to add subparagraph (e):

(e) Unprotected bulkheads or soffits behind the spray of side wall sprinklers shall not exceed 8 inches in width for residential sidewalls and 12 inches for dry sidewalls.

Sec. 31 NFPA 13R, paragraph 6.8.4, add: All calculations shall include at least a 10% safety factor to account for minor field changes, unless a listed fire pump is necessary to obtain this safety factor.

Sec. 32 NFPA 14, paragraph 4.7.2 is amended as follows: Each fire hose valve shall be provided with 2 1/2 in. hose connection, 2 1/2 in. to 1 1/2 in. reducer, cap, and chain.

Sec. 33 NFPA 14, paragraph 5.1.2, add:

(1) Systems shall be automatic wet type.
(2) Standpipe systems in unheated areas shall be automatic dry type.
(3) Standpipe systems in detached open parking garages may be the manual dry type, if the piping is air supervised for breaks or open valves.
(4) Occupant use hose is prohibited in new or existing buildings.
(5) New standpipe systems shall be Class I only.

Sec. 34 NFPA 14, paragraph 6.4 (Fire Department Connections), add:

(1) Number of 2 1/2 in. inlets:

System Demand (gpm)	No. of Inlets

up to 749	2
750-999	3
1,000 and above	4

(2) Multiple connections on the same building shall be interconnected.
(3) When a section of a building is fed by a connection (i.e., partial systems), permanent all weather identification signs shall be provided on connections.

Sec. 35 NFPA 14, paragraph 7.3.2(1), amend to read:

"At the highest intermediate landing between floor levels or each main landing in every required exit stairway."

Sec. 36 NFPA 14, paragraph 7.3.2.3, add:

(1) Measurement shall be parallel or at right angles to walls.
(2) Supplemental hose valves outside the stairs shall not be located within tenant spaces, unless hose reach requirements cannot be met by placement of valves in public corridors or by use of wall hydrants for spaces opening to the exterior. Hose valve locations shall be marked by the placement of signs, the striping of columns, or other approved methods.

Sec. 37 NFPA 14, paragraph 7.8.1.1, add exceptions:

Exception 1: In high-rise buildings, where booster pumps are necessary to produce the required residual pressures, pumps and piping systems must be sized to provide for the demand of the hydraulically most remote hose station, or the sprinkler system demand, whichever is greater. The standpipe system must also be sized to provide the required flow and pressure for all hose stations required to be flowing, when supplied by 150 psi at 1000 gpm at the fire department connection(s). Two sets of calculations will, therefore, be required under this exception.

Exception 2: Systems in buildings that are not high-rise, and dry systems with no automatic water supply, may be sized to obtain the required flows and pressures, when supplied by 150 psi at 1000 gpm at the fire department connection(s).

Exception 3: In existing buildings, after shell occupancy, hose valves added to correct reach

violations created by tenant modifications may be supplied by 3 inch pipe without recalculation.

Sec. 38 NFPA 20, paragraph 5.18.1.2, add: A relief valve shall be permitted to be installed to reduce operating pressure below 175 psi at high gradient.

Sec. 39 NFPA 20, paragraph 5.18.7 is amended entirely to state: For other than static water supplies, relief valves shall not be piped back into the source of the supply.

Sec. 40 NFPA 72, paragraph 4.4.6.1, add the following sentence: An annunciator with the following features is required when the building is greater than one story, over 20,000 square feet in area per floor, or has more than one type of alarm initiating device.

Exception 1: Apartments protected by a 13R sprinkler system.
Exception 2: Any building not exceeding two stories above grade and 3,000 square feet per floor.

(a) Annunciator shall have a visible signal for each different floor, zone, and device type. Supervised computer screen or printer type annunciators may be used to meet this requirement if the zone identification is approved by the Fire Chief.
(b) Unless otherwise approved by the authority having jurisdiction, zones shall not exceed a single floor, 20,000 square feet, or 300 linear feet. Sprinkler systems shall be permitted to be zoned in accordance with the applicable sprinkler standard.
(c) If two or more zones per floor are required, a graphic outline on or adjacent to the annunciator shall be provided showing the building outline, zone boundaries, "you are here" notation, north compass arrow, all stairways, stairway identification numbers, all standpipe risers, elevators, and the building address.
(d) A lamp type annunciator shall have a lamp test switch unless the annunciator circuits are supervised.
(e) The annunciator shall be located at, and visible from, the main fire department entrance unless the building has a fire command center.
(f) If two or more buildings are controlled by one alarm system, an annunciator shall be installed in each building with a pilot lamp indicating the building of alarm origination.

Sec. 41 NFPA 72, paragraph 5.7.3.2.3.3, add new paragraph 5.7.3.2.3.3.1:

5.7.3.2.3.3.1 Detectors which activate required extinguishing systems on a cross-zoned or multiple-zone basis shall be spaced at a maximum of one-half of their allowed or listed square footage spacing.

Sec. 42 NFPA 72, paragraph 5.7.4.2.2, add: Activation of duct smoke detectors shall sound an audible

alarm in a normally occupied area or through the building fire alarm system, and shall be identified as duct detector. Where connected to the building alarm, the signal shall be supervisory only and shall not initiate the building evacuation alarm unless a confirmation or verification feature is provided.

Sec. 43 NFPA 72, paragraph 5.7.1.7 is amended as follows: Detectors located at the top of shafts and stairs shall be on a supervisory circuit only unless a confirmation or verification feature is provided. The location shall be identified at the annunciator or fire alarm control panel.

Sec. 44 NFPA 72, paragraph 5.11.2, add: Standpipe or main water flow indicators, if provided, shall sound a supervisory signal only.

Sec. 45 NFPA 72, the second sentence under paragraph 5.13.4 is changed to read: "The center of each manual fire alarm pull station shall be between 42 and 48 inches above the floor level."

Sec. 46 NFPA 72, paragraph 5.13, is amended by adding subparagraph 5.13.9

5.13.9 When fire alarm systems are not monitored by a UL listed central station, an approved permanent sign shall be installed adjacent to each manual fire alarm box. The sign shall read as follows:

Local Alarm Only:

(1) Activate Alarm
(2) Exit Building
(3) Call Fire Department

Sec. 47 NFPA 72, paragraph 6.10.1.15 is amended by changing "two" to "six".

MONTGOMERY COUNTY EXECUTIVE REGULATION

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Sec. 48 NFPA 72, paragraph 11.8.3.5, add new paragraph (11):

(11) Enclosed rooms with a closet such as dens, libraries, studies, or sitting rooms which could be used as a sleeping area shall be treated as bedrooms.

Approved,

Isiah Leggett
County Executive

Approved as to form and legality
Montgomery County, Md. County Attorney's Office
By

OFFICE OF THE COUNTY EXECUTIVE
ROCKVILLE, MARYLAND 20850

Isiah Leggett
County Executive

MEMORANDUM

TO: Roger Berliner, President
Montgomery County Council

FROM: Isiah Leggett, County Executive

SUBJECT: Executive Regulation 10-12, Fire Safety Code – Building Construction

The purpose of this memorandum is to transmit Executive Regulation 10-12, "Fire Safety Code – Building Construction," for review and consideration by the County Council. Executive Regulation 10-12 adopts and modifies the applicable editions of various National Fire Protection Association (NFPA) standards – most notably NFPA 1, Uniform Fire Code and NFPA 101, Life Safety Code – as adopted by the Maryland State Fire Prevention Code. These codes and the associated codes and standards incorporated by reference are adopted to establish a reasonable level of safety from the hazards created by fire, explosion, and dangerous conditions. The changes do not retroactively apply to unaltered existing buildings, existing systems, or existing conditions permitted or approved before the date of the adoption of this regulation unless an inimical hazard exists.

The Department of Permitting Services has been delegated the authority by the Fire Chief of Montgomery County Fire and Rescue Services to adopt regulations pursuant to Chapter 22 of the Montgomery County Code in the cases of a new building, a new system, or new conditions.

The regulation was advertised in the April 2012 issue of the Montgomery County Register, and no comments were received. As advertised in the Montgomery County Register notice, a public hearing was held on April 18th, 2012. There were no speakers who offered comments during the hearing. If there are any questions, please call Hemal Mustafa at 240-777-6226.

Attachments

Fiscal Impact Statement
Executive Regulation 10-12, Fire Safety Code – Building Construction

1. Executive Regulation Summary

   This regulation adopts the applicable editions of various National Fire Protection Association (NFPA) standards – most notably NFPA 1, Uniform Fire Code and NFPA 101, Life Safety Code – as adopted by the Maryland State Fire Prevention Code. These codes and the associated codes and standards incorporated by reference are adopted to set the minimum requirements to establish a reasonable level of safety from the hazards created by fire, explosion, and dangerous conditions. The changes do not retroactively apply to unaltered existing buildings, existing systems or existing conditions permitted or approved before the date of adoption of this regulation unless an inimical hazard exists.

2. An estimate of changes in County revenues and expenditures regardless of whether the revenues or expenditures are assumed in the recommended or approved budget. Includes source of information, assumptions, and methodologies used.

   There is no change in County revenues or expenditures due to this regulation. The regulation establishes the minimum level of safety within buildings.

3. Revenue and expenditure estimates covering at least the next 6 fiscal years.

   There are no revenues or expenditures associated with this regulation.

4. An actuarial analysis through the entire amortization period for each regulation that would affect retiree pension or group insurance costs.

   Not applicable.

5. Later actions that may affect future revenue and expenditures if the regulation authorizes future spending.

   Not applicable.

6. An estimate of the staff time needed to implement the regulation.

   Approximately 20 staff persons will need to attend an in-house training session or otherwise familiarize themselves with the requirements. The in-house training is not expected to last more than 6 hours.

7. An explanation of how the addition of new staff responsibilities would affect other duties.

   No staff is added as a result of this proposed regulation.

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8. An estimate of costs when an additional appropriation is needed.

   Not applicable.

9. A description of any variable that could affect revenue and cost estimates.

   Not applicable.

10. Ranges of revenue or expenditures that are uncertain or difficult to project.

    Not applicable.

11. If a regulation is likely to have no fiscal impact, why that is the case.

    This regulation is an update to the construction standards applicable to Montgomery County. The regulation proposes no new fees nor generates any additional expenditures.

12. Other fiscal impacts or comments.

    Not applicable.

13. The following contributed to and concurred with this analysis.

    Alicia Thomas, Department of Permitting Services
    Amy Wilson, Office of Management and Budget

Jennifer A. Hughes, Director
Office of Management and Budget

3/26/12
Date

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MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE – BUILDING CONSTRUCTION	Number: 10-12
Originating Department: DEPARTMENT OF PERMITTING SERVICES	Effective Date:

Montgomery County Regulation on:

FIRE SAFETY CODE - BUILDING CONSTRUCTION
Montgomery County Department of Permitting Services

Issued By: County Executive
Regulation No: 10-12
Authority: Code Section 22-13
Council Review: Method 2 under Code Section 2A-15
Register Vol. 29, Issue 4
Comment Deadline: April 30, 2012
Effective Date:
Sunset Date: None

SUMMARY: This regulation adopts the applicable editions of various National Fire Protection Association (NFPA) standards – most notably NFPA 1, Uniform Fire Code and NFPA 101, Life Safety Code – as adopted by the Maryland State Fire Prevention Code. These codes and the associated codes and standards incorporated by reference are adopted to set the minimum requirements to establish a reasonable level of safety from the hazards created by fire, explosion, and dangerous conditions. The changes do not retroactively apply to unaltered existing buildings, existing systems or existing conditions permitted or approved before the date of adoption of this regulation unless an inimical hazard exists.

The Department of Permitting Services has been delegated the authority by the Fire Chief (of Montgomery County Fire and Rescue Services) to adopt regulations pursuant to Chapter 22 of the Montgomery County Code in the cases of a new building, a new system, or new conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

ADDRESSES: Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, MD 20850

STAFF: For further information, contact Mike Pokorny, Senior Permitting Services Specialist, Division of Building Construction, 240-777-6235.

MONTGOMERY COUNTY EXECUTIVE REGULATION

Offices of the County Executive . 101 Monroe Street . Rockville, Maryland 20850

Subject: FIRE SAFETY CODE – BUILDING CONSTRUCTION	Number: 10-12
Originating Department: DEPARTMENT OF PERMITTING SERVICES	Effective Date:

Sec. 1 In accordance with the procedures authorized in Chapter 22, "Fire Safety Code," of the Montgomery County Code, 1996, this Executive Regulation applies to the safeguarding of life, property, and the public welfare from the hazards of fire and explosion arising from the improper storage, handling, or use of substances, materials, or devices and from conditions hazardous to life, property, and the public welfare in the use or occupancy of buildings, structures, sheds, tents, lots or premises.

In this regulation the term "Fire Chief" means the Fire Chief of the Montgomery County Fire and Rescue Service and includes the Fire Chief's designees.

The Department of Permitting Services has been delegated authority by the Fire Chief to enforce the requirements of the Montgomery County Fire Safety Code as it pertains to new facilities, elements, structures, and conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

Sec. 2 Unless otherwise noted, all references to the National Fire Codes and Standards adopted in these regulations are to those codes, standards, recommended practices and manuals in the National Fire Codes, published by the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. The references to these National Fire Codes and Standards are set forth in Section 22-14 of the Montgomery County Code, 1996.

Terms used in this regulation which are defined in the state adopted consensus codes shall have the definitions of the consensus code.

Sec. 3 Standards Adopted. The following standards published by the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269, are incorporated in these regulations except as expressly amended. The dates or editions of the individual codes and standards are as listed in this section.

NFPA No.	CODE OR STANDARD
1	Uniform Fire Code – 2009 edition
42	Code for the Storage of Pyroxylin Plastic – 2002 edition
101	Life Safety Code – 2009 edition

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	130	Standard for Fixed Guideway Transit and Passenger Rail Systems – 2007 edition
	214	Standard on Water Cooling Towers – 2005 edition
	720	Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment – 2009 edition
	850	Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations – 2005 edition

Sec. 4 The Fire Chief must review this regulation and propose amendments within six months after the date the State Fire Prevention Commission adopts new amendments to NFPA 1 and NFPA 101 into the State Fire Prevention Code.

Sec. 5 Delete NFPA 1, Section 1.9.

Sec. 6 Delete NFPA 1, Section 1.10.

Sec. 7 Delete NFPA 1, Subsection 1.11.3.

Sec. 8 Amend NFPA 1, Section 1.12.1, add a new subsection 1.12.1.1 as follows: 1.12.1.1 Permits, certificates, notices, approvals or orders required by this code shall be governed by the policies and procedures of the AHJ.

Sec. 9 Amend NFPA 1, Section 1.12.7 to change the word "shall" to "may".

Sec. 10 Amend NFPA 1, Section 2.2 to delete the referenced publication NFPA 5000 Building Construction and Safety Code, 2009 edition. Wherever NFPA 5000 is referenced, other than for extracted text, substitute the building code adopted by Montgomery County.

Sec. 11 Amend NFPA 1, Section 3.3.115 to add "and as referenced in Public Safety Article Section 10-101, Annotated Code of Maryland."

Sec. 12 Amend NFPA 1, Section 3.3.170.6 to delete phrase "more than 3 but".

Sec. 13 Amend NFPA 1, Section 3.3.170.7 and Section 6.1.4.1 to delete phrase "four or more".

Sec. 14 Amend NFPA 1, Section 3.3.170.20 to replace the word "three" with "five" and delete the phrase ",if any, accommodated in rented rooms."

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Sec. 15 Amend NFPA 1, Section 3.3.170.23 and Section 6.1.9.1 to replace the word "four" with "six".

Sec. 16 Amend NFPA 1, Section 4.5.8.1 and Section 10.4.1 to delete the phrase "for compliance with the provisions of this Code".

Sec. 17 Amend NFPA 1, Section 4.5.8.3 and Section 10.4.3 to delete the phrase "by the Code".

Sec. 18 Amend NFPA 1, Section 10.1.2 to add the phrase "except as amended by COMAR 29.06.01.07, COMAR 29.06.01.08, and COMAR 29.06.01.09".

Sec. 19 Amend NFPA 1, Section 10.5.1 to replace "AHJ" with "AHJ or incident commander".

Sec. 20 Amend NFPA 1, Section 10.11.6 to replace "grill" with "gas-fired, charcoal or electric grill" and "10 feet (3 meters)" with "20 feet (6.1 meters)"

Sec. 21 Delete NFPA 1, Section 10.11.6.1

Sec. 22 Amend NFPA 1, Subsection 10.12.1 to add the following Subparagraph and Paragraph:

10.12.1.1.1 Subject to the approval of the AHJ, individual suites within structures and rear exterior entrances and/or access from service corridors shall be clearly identified.

10.12.1.4 Where required by the AHJ, symbols in compliance in with NFPA 170, Standard for Fire Safety and Emergency Symbols, shall be used.

Sec. 23 Amend NFPA 1, Sections 10.12.1.2 and 10.12.1.3 to replace "address numbers" with "premises identification".

Sec. 24 Replace NFPA 1, Table 10.14.1.1 with the following table:

Occupancy	No Trees Permitted	Cut Tree Permitted with Automatic Sprinkler Systems	Cut Tree Permitted without Automatic Sprinkler Systems	Balled Tree Permitted
Ambulatory Health Care		X	X	X
Apartment Buildings		Within Unit	Within Unit	X
Assembly		X	X	X
Board and Care		X		X
Business		X	X	X

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Day Care Centers		X		X
Day Care Family		X	X	X
Detention and Correctional	X			
Dormitories		X	X	X
Educational	X			
Health Care		X	X	X
Hotels		X	X	X
Industrial		X	X	X
Lodging and Rooming		X	X	X
Mercantile		X	X	X
One- and Two- Family		X	X	X
Storage		X	X	X

Sec. 25 Amend NFPA 1, Section 10.14.1 to add the following new paragraph

10.14.1.2 The AHJ shall:
(1) Approve the placement of a natural cut or balled tree;
(2) Limit the number of natural cut or balled trees displayed; and
(3) Order the removal of any tree if the tree poses a hazard to life or safety.

Sec. 26 Amend NFPA 1, Paragraph 10.14.3.1 to replace "by the manufacturer as being fire retardant" with "by a tested laboratory recognized by the Office of the State Fire Marshal".

Sec. 27 Amend NFPA 1, Section 10.14.9.1 to replace "1/2 inch (13 mm)" with "2 inches (50 mm)" and add the following sentence: "A natural cut tree shall not exceed 10 feet (3 m) in height, excluding the tree stand."

Sec. 28 Amend NFPA 1, Section 10.15.2 to insert the phrase ", but not limited to," after the words "such as".

Sec. 29 Amend NFPA 1, Section 10.15.11.2.6 to replace "any vehicles" with "any vehicles, buildings."

Sec. 30 Amend NFPA 1, Section 10.15.11.3.1 add the following at the end of the section "or within the fuel break described in Section 10.15.11.2.6."

Sec. 31 Amend NFPA 1, Section 10.16, add a new subsection 10.16.6 as follows:

10.16.6 The AHJ shall have the authority to require that outdoor storage of any combustible material be enclosed by an approved fence or other protective enclosure to prevent unauthorized access.

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Sec. 32 Amend NFPA 1, Section 10.16.1 to replace "10 ft (3 m)" with "15 ft (4.6 m)" and to replace "property line" with "property line, building, or adjacent pile of combustible material".

Sec. 33 Amend NFPA 1, Section 10.16.3 to add the following:
The separation distance shall be allowed to be increased where the AHJ determines that a higher hazard to the adjoining property exists.

Sec. 34 Amend NFPA 1, Section 10.16.5 to add the phrase "and 10,000 ft^2 in area".

Sec. 35 Amend NFPA 1, Section 11.1 to add the following subsection:

11.1.11 Clearance. A clear space of not less than 30 inches (762 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided in front of electrical service equipment. Where the electrical service equipment is wider than 30 inches (762 mm), the clear space shall not be less than the width of the equipment. No storage of any materials shall be located within the designated clear space. Exception: Where other specialized dimensions are required or permitted by NFPA 70.

Sec. 36 Add NFPA 1, Sections 11.1.9.2.1 and 11.1.9.2.2 to read:

11.1.9.2.1 In new buildings, excluding one and two family dwellings, a shunt trip to disconnect the electrical service to the building shall be provided as follows:

(a) In the emergency command center, where an emergency command center is in the building.
(b) At the fire alarm annunciator, where there is a fire alarm annunciator and where there is no emergency command center.
(c) In an appropriately sized and weatherproof fire department access box on the address side of the building, where there is no emergency command center or fire alarm annunciator.

11.1.9.2.2 In existing buildings, excluding one and two family dwellings, where there are significant upgrades to the building electrical service, such as modifying or replacing the switchgear, a disconnecting means shall be provided as for new installations.

Sec. 37 Amend NFPA 1, Paragraph 11.1.9.3 to add the following subparagraph:

11.1.9.3.3 Doors to electrical control panel rooms shall be marked with a plainly visible and legible sign stating ELECTRICAL ROOM or similar approved wording in contrasting letters not less than 1 inch (25 mm) high and not less than ¼ inch (6.4 mm) in stroke width.

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Sec. 38 Amend NFPA 1, subsection 11.9.1 to replace "approved by the fire department" with "approved by the AHJ".

Sec. 39 Amend NFPA 1, Section 11.9.1 to add the following subsections:

11.9.1.1 In new installations, the emergency command center shall have a door directly to the exterior of the building on the address side. The exterior door to the emergency command center shall be within 50 feet of a fire department access road. A fire department access box shall be provided within 6 feet of the door to the emergency command center. The exterior door to the emergency command center shall be identified on the exterior face as the emergency command center in a manner acceptable to the Fire Chief.

11.9.1.2 In new installations, the emergency command center shall also comply with the provisions of Section 911 of the International Building Code, 2009 edition.

Sec. 40 Amend NFPA 1, Section 11.9.5(8) to read as follows:

(8) Fire pump status indicators and remote starting.

Sec. 41 Amend NFPA 1, Sections 13.1.9, 13.1.10 and 13.7.1.4.4 to add: When a property owner or the owner's agent cannot be contacted to establish a fire watch, the Montgomery County Fire and Rescue Service at their discretion may provide the fire watch and charge the property owner the inspection overtime rate per person per hour.

Sec. 42 Amend NFPA 1, Section 13.2.2.2 to delete the existing wording and replace with the following: All new buildings shall be equipped with an approved standpipe system where required by the building code adopted by Montgomery County. Where a Class III system is required, a Class I system shall be permitted.

Sec. 43 Amend NFPA 1, Section 13.3.1.2 to add the following subsection:

13.3.1.2.1 For new ceiling installations, drop-out ceilings as referenced in NFPA 13, Subsection 8.15.14 shall be prohibited.

Sec. 44 Amend NFPA 1, Section 13.3.1.7.2 to read: "Where supervised automatic sprinkler protection is required by another section of this Code, waterflow alarms shall be automatically transmitted to a listed central station."

Sec. 45 Amend NFPA 1, Section 13.3.2.1 to add the following subsection:

13.3.2.1.1 All new buildings shall be equipped with automatic sprinkler system or other

automatic fire suppression system where required by Section 903 of the building code adopted by Montgomery County. Exception: Day care facilities that comply with the sprinkler requirements of the NFPA 101 Life Safety Code (2009 edition).

Sec. 46 Amend NFPA 1, Section 13.3.2.24.2 by adding at the beginning of the section the phrase "Except as modified by 13.3.2.24.4," and adding a new subsection 13.3.2.24.2.4 which reads:

13.3.2.24.2.4 The requirement of 13.3.2.24.2 shall not apply to existing apartment occupancy high-rise buildings.

Sec. 47 Amend NFPA 1, Sections 13.3.3.1 and 13.3.3.2 to delete the phrase "installed in accordance with this Code."

Sec. 48 Amend NFPA 1, Section 13.4.1 to add the following subsection:

13.4.1.1.1 No fire pump component, including the pump, driver, or controller, shall be permitted to be installed in below ground vaults or pits unless otherwise approved by the AHJ.

Sec. 49 Amend NFPA 1, Section 13.5.2 to add the following phrase at the end of the section "as modified by Montgomery County Executive Regulation 29-08AM 'Fire Safety Code – Fire Department Apparatus Access and Water Supply'".

Sec. 50 Amend NFPA 1, Section 13.6.2 to add the phrase ", unless otherwise permitted by the AHJ."

Sec. 51 Amend NPFA 1, Section 13.7.1.4.8.6 is amended as follows:

(a) Add the following sentence to the end of the section: "This paragraph does not permit the omission of manual fire alarm boxes in accordance with other provisions of this subsection unless specifically permitted by Chapters 11 through 43.

(b) Add two new subsections as follows:

13.7.1.4.8.6.1 Zoned fire alarm systems shall have manual pull stations located at the entrance to each exit enclosure and at the main exit.

13.7.1.4.8.6.2 When a fire alarm system is required in a multiple tenant building, for each tenant exiting directly to the exterior of the building, a manual pull station and approved occupant notification shall be located at each required or marked exit.

Sec. 52 Amend NFPA 1, Section 13.7.1.4.8.9 to add the following sentence: "In environments not suitable for smoke detectors, alternate means of detection shall be provided and shall comply

with NFPA 72 Section 4.4.4.1."

Sec. 53 Amend NFPA 1, Section 13.7.1.4.10.2.1, delete the phrase "lobby,".

Sec. 54 Amend NFPA 1, Section 13.7.1.4.10.4 by adding the following at the end of the sentence: "only when the initial fire alarm signal is automatically transmitted without delay to a listed central station in accordance with 13.7.1.4.11."

Sec. 55 Amend NFPA 1, Section 13.7.1.4.10.7 by adding a second sentence to read: "Required audibility shall be met with all intervening doors (between any space and the audible devices) closed."

Sec. 56 Amend NFPA 1, Section 13.7.1.4.10.9 by adding: Where voice type occupant notification is used, automatic pre-recorded messages shall be used complying with Section 13.7. Live voice as the sole notification method is prohibited – except that previously "approved" live voice systems shall be permitted to remain.

Sec. 57 Amend NFPA 1, Section 13.7.1.4.11.2 by deleting the list of four items and replace the phrase "any of the following means acceptable to the authority having jurisdiction" with "by a listed central station fire alarm system".

Sec. 58 Delete NFPA 1, Section 13.7.1.4.11.3.

Sec. 59 Amend NFPA 1, Section 13.7.1.4.12.2(3) by adding the following sentence: "Manual fire alarm initiation shall not activate floor or zone-dependent smoke control systems."

Sec. 60 Delete NFPA 1, Section 13.7.1.4.14.10.3

Sec. 61 Delete NFPA 1, Sections 13.7.2.10.2.2 and 13.7.2.12.3.2

Sec. 62 Amend NFPA 1, Section 13.7.2.14.4 to add at the end of the sentence, "...only if the existing smoke alarms are battery operated."

Sec. 63 Amend NFPA 1, Section 13.7.2.16.1.4.4 and Section 13.7.2.16.2.2.1 by adding at the end of the sentence, "...and have secondary battery back-up power."

Sec. 64 Amend NFPA 1, Section 13.7.2.17.1 and Section 13.7.2.18.1 are amended to read as follows: Class A mercantile occupancies and multiple story Class B mercantile occupancies shall be provided with a fire alarm system in accordance with Section 13.7 and NFPA 101.

Sec. 65 Amend NFPA 1, Section 13.7.2.22.1.2 and Section 13.7.2.22.1.3 to replace the phrase "Storage occupancies" with "Storage occupancies less than three stories".

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Sec. 66 Amend NFPA 1, Sections 13.7.2.23.2 and 13.7.2.24.2 to add the following exception:

Exception: Day-care occupancies located in school facilities where enrollment is limited to children capable of self preservation, where no sleeping facilities are provided and the school is provided with approved full automatic sprinkler protection.

Sec. 67 Amend NFPA 1, Section 13.7.2.23.3 to add the following subsection:

13.7.2.23.3.4 Approved battery-operated smoke alarms, rather than house electrical service-powered smoke alarms required by 13.7.2.23.3.3, shall be permitted where the facility has testing, maintenance, and battery replacement programs that ensure reliability or power to the smoke alarms.

Sec. 68 Amend NFPA 1, Section 13.7.2.24.3.4 to delete the word "existing".

Sec. 69 Amend NFPA 1, Section 13.7.2.27.2.1 by adding a new subsection 13.7.2.27.2.1.1 as follows:

13.7.2.27.2.1.1 In buildings having staged evacuation the voice fire alarm system shall send a predetermined message to the floor where the alarm originated, to the floor immediately below and to the floor immediately above, providing information and direction to the occupants. Any subsequent alarm(s) on other than the initial fire floor must initiate the voice fire alarm as described above. The voice fire alarm shall be designed to be heard clearly by all occupants within the designated portions thereof as required by Section 9.6, but it shall not sound automatically in elevator cars and enclosed exit stairways. Communicating levels shall be considered one floor/fire area for the audible and visual fire alarm signals.

Sec. 70 Add NFPA 1, Section 13.9 to read as follows: "In new buildings, an emergency command center in accordance with Section 11.9 shall be required in buildings, other than parking garages, with a gross floor area greater than 100,000 square feet."

Sec. 71 Amend NFPA 1, Section 14.5.2.7 to add the phrase "and all stairway doors shall be unlocked simultaneously without unlatching upon a signal from the fire command center." to items (2) and (3).

Sec. 72 Amend NFPA 1, Section 14.5.2.7.1 to add an item (6), to read:

(6) Entry levels shall provide free access to an approved second exit. These levels shall be designated in "core/shell" building permit drawings with future tenant layouts arranged accordingly.

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Sec. 73 Amend NFPA 1, Table 14.8.1.2 to add on the chart for Business Use "for calculating occupant loads in shell use business use is 65 square feet (6.0 square meters) per person."

Sec. 74 Amend NFPA 1, Section 14.10.1.3.1 to add new subsection 14.10.1.3.1.1:

14.10.1.3.1.1 In non-sprinklered new buildings, parallel paths of travel shall be considered remote if not less than forty (40) feet apart, or separated by assemblies having continuous one hour fire resistance with self-closing and positive latching twenty (20) minute fire [resistance] protection rated opening protectives. In fully sprinklered buildings and existing buildings paths of travel shall be considered remote if not less than thirty (30) feet apart, or separated by assemblies with self-closing opening protectives which are resistant to the passage of smoke. This minimum separation of paths shall not supersede minimum separation of exits or doors in 14.10.1.3.2.

Sec. 75 Amend NFPA 1, Section 14.11.2.3 by adding two sentences at the end of the section as follows:

In new installations, the door to the exterior of the building shall be in direct sight of the point of the termination of the exit. For the purposes of this section, in new installations, the use of exit signs or other exit markings shall not be considered as making the way to the exterior "readily visible and identifiable".

Sec. 76 Amend NFPA 1, Section 14.13.1.2 to replace the word "only" in the first sentence with ", but not be limited to,"

Sec. 77 Amend NFPA 1, Section 14.14.8.3.1 to add: If the sign is on the door, then the door must be equipped with an approved self-closing device.

Sec. 78 Amend NFPA 1, Section 18.1.1.1 and Section 18.1.1.2 to replace the word "fire department" with "AHJ".

Sec. 79 Amend NFPA 1, Section 18.2.2 to add the following subsection:

18.2.2.4 In new installations, not less than one exit stair which serves all stories of the building shall be accessible by an internal corridor from the main entrance of the building or fire department response location.

Sec. 80 Amend NFPA 1, Section 18.2.2.1, add two new subsections as follows:

18.2.2.1.1 All occupancies other than 1 and 2 family dwellings shall be provided with an approved access box.

Exception 1: The requirement for an access box shall not apply when the occupancy provides 24-hour on-site staffing with access to all areas in the building or complex. At least one person must staff a fixed location proximate to the main building or complex entrance to provide ready access for the fire department.

Exception 2: For multiple occupancies located within a single structure, a single access box shall be permitted with approval of the Fire Chief.

Exception 3: For multiple structures within a residential building complex, a single access box shall be permitted with approval of the Fire Chief.

18.2.2.1.2 The size, contents, and location of the access box shall be determined by the Fire Chief in cooperation with the occupancy owner or management.

Sec. 81 Amend NFPA 1, Section 18.2.3 to add the following: The AHJ shall have the authority to require and designate public or private fire lanes and fire department access roads as considered necessary.

Sec. 82 Amend NFPA 1, Section 18.2.3.1.3 to delete "When not more than two one- and two-family dwellings or private garages, carports, sheds, and agricultural buildings, and detached buildings or structures 400 ft^2 (37 m^2) or less are present,".

Sec. 83 Amend NFPA 1, Section 18.2.3.2.1 to replace the phrase "exterior door" with "exterior door acceptable to the AHJ".

Sec. 84 Amend NFPA 1, Section 18.3.1 to add the following sentence:
Regardless of new or existing conditions, Section 18.3.1.1 shall apply.

Sec. 85 Amend NFPA 1, Section 18.3.1 to add the following subsection:

18.3.1.1 For new and existing conditions, the hydrant closest to the property shall be capable of delivering a minimum of 1000 gallons per minute with 20 psi residual pressure. The next closest hydrant shall be capable of flowing a minimum of 500 gallons per minute at the same time.

Sec. 86 Amend NFPA 1, Section 18.3.3 to add the following subsection:

18.3.3.1 For buildings without automatic sprinklers within areas provided with a municipal water supply, the distance from the building to the closest hydrant shall not exceed 400 feet when measured along the path of fire department access.

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Sec. 87 Amend NFPA 1, Section 20.3.4.1.1 to delete the phrase "more than 3, but" and after the ","after "12".

Sec. 88 Amend NFPA 1, Section 20.3.4.2.3.5.1 to add the following exception. Exception: Day-care homes.

Sec. 89 Amend NFPA 1, Section 20.3.4.2.3.5.4 to add the following exception. Exception: Day-care homes with not more than three clients for overnight lodging.

Sec. 90 Amend NFPA 1, Section 20.5.2.3.6 by adding a sentence as follows: "If more than three residents are not able to participate in the drill, the facility shall be considered as a Health Care Occupancy and shall be reevaluated in accordance with NFPA 101, Section 43.7.

Sec. 91 Amend NFPA 1, Section 25.2.2.1 to add the phrase "or other approved testing standard approved by the State Fire Marshal".

Sec. 92 Amend NFPA 1, Section 31.3.6.2.2 to add the following item:

(9) Piles containing leaves and other extraneous or hogged material, such as whole tree chip piles, shall be turned or reclaimed at least every 3 months.

Sec. 93 Amend NFPA 1, Section 31.3.6.3.1 to delete the existing wording and replace with the following:

Piles may not exceed 18 feet in height, 50 feet in width, and 350 feet in length. Piles shall be subdivided by fire lanes having at least 25 feet of clear space at the base of piles.

Sec. 94 Delete NFPA 1, Section 31.3.6.3.2, Section 31.3.6.3.2.1, Section 31.3.6.3.2.2, and Section 31.3.6.3.2.3.

Sec. 95 Amend Section 42.7.5 to add the following subsections:

42.7.5.7 Management/owners officials or employees shall conduct daily site visits to ensure that all equipment is operating properly.

42.7.5.8 Regular equipment inspection and maintenance at the unattended self-service facility shall be conducted.

42.7.5.9 Fuel dispensing equipment shall comply with one of the following:
(1) The amount of fuel being dispensed is limited in quantity by preprogrammed card; or
(2) Dispensing devices shall be programmed or set to limit uninterrupted fuel delivery of not more than 25 gallons and shall require a manual action to resume continued delivery.

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Sec. 96 Amend NFPA 1, Section 42.7.5.5 to add the following:
The following information shall be conspicuously posted in this area:
(1) The exact address of the unattended self-service facility.
(2) The telephone number of the owner or operator of the unattended self-service facility.

Sec. 97 Amend NFPA 1, Section 50.2.1 to add the following subsections:

50.2.1.10 Commercial Outdoor Cooking Operations. These requirements apply to commercial outdoor cooking operations such as those that typically take place under a canopy or tent type structure at fairs, festivals and carnivals. This includes but is not limited to deep frying, sautéing, and grilling operations.

50.2.1.10.1 Tent and Canopy Requirements.

50.2.1.10.1.1 Tents or canopies where cooking equipment not protected in accordance with NFPA 96 is located shall not be occupied by the public and shall be separated from other tents, canopies, structures, or vehicles by a minimum of 10 feet (3050 mm) unless otherwise approved by the AHJ.

50.2.1.10.1.2 All tent and canopy material shall comply with flame resistance requirements of Section 25.2.2.

50.2.1.10.2 LP Gas Fuel Requirements.

50.2.1.10.2.1 LP gas tank size shall be limited to 60 lbs. The total amount of LP gas on site shall not exceed 60 lbs for each appliance that is rated not more than 80,000 btu/hr and 120 lbs for each appliance rated more than 80,000 btu/hr.

50.2.1.10.2.2 Tanks must be maintained in good physical condition and shall have a valid hydrostatic date stamp.

50.2.1.10.2.3 Tanks shall be secured in their upright position with a chain, strap or other approved method that prevents the tank from tipping over.

50.2.1.10.2.4 Tanks shall be located so that they are not accessible to the public. LP gas tanks shall be located at least 5 feet from any cooking or heating equipment or any open flame device.

50.2.1.10.2.5 All LP gas equipment shall be properly maintained and comply with the requirements of NFPA 58.

50.2.1.10.2.6 Regulators. Single-stage regulators shall not supply equipment that is rated

more than 100,000 btu/hr rating. Two-stage regulators shall be used with equipment that is rated more than 100,000 btu/hr.

50.2.1.10.3 General Safety Requirements.

50.2.1.10.3.1 All electrical cords shall be maintained in a safe condition and shall be secured to prevent damage.

50.2.1.10.3.2 Movable cooking equipment shall have wheels removed or shall be placed on blocks or otherwise secured to prevent movement of the appliance during operation.

50.2.1.10.3.3 Portable fire extinguishers shall be provided in accordance with NFPA 1, Section 13.6 and shall be specifically listed for such use.

Sec. 98 Annex O - In-Building Public Safety Radio Enhancement System of NFPA 1 is adopted.

Sec. 99 NFPA 1, Section O.3.2 is modified to read as follows:

"Radio Coverage. Radio coverage shall be provided throughout the building such that a minimum of 95% of the building (including all underground levels, basements, elevators, stairways, etc.) is covered at a minimum of 95% of the time."

Sec. 100 Delete NFPA 1, Sections O.3.2.1 and O.3.2.2 and renumber Section O.3.2.3 as O.3.2.1.

Sec. 101 Amend NFPA 1, Section O.3.5.5 to read as follows:

"At a minimum, a two inch diameter conduit/conduit sleeves shall be provided vertically from the roof level to the lowest level of the structure. This conduit will provide a vertical path for cable to all levels and should pass through the in-building public safety radio enhancement system equipment room. At a minimum, one 20-amp AC circuit and building ground shall be located at the public safety radio enhancement system equipment and any outside antenna locations."

Sec. 102 Modify NFPA 1, Section O.3.6.3 to read as follows:

"Secondary Power Source. The secondary power source shall provide enough capacity to power the in-building public safety radio enhancement system for 12 hours at 100 percent system operation capacity. Where the building is provided with a generator, the generator shall supply secondary power to the in-building public safety radio enhancement system."

Sec. 103 Delete NFPA 1, Section O.3.7.2

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Sec. 104 Modify NFPA 1, Section O.3.9.3 to read as follows:

"Test procedures. The test plan shall ensure testing throughout the building. Test procedures shall be as directed by the design professional and the AHJ. Using the Montgomery County control channel, each floor shall be RF (radio frequency) signal level mapped utilizing a calibrated, portable spectrum analyzer. Each floor shall be divided into equal grids of no larger than 50 feet by 50 feet. Individual testing points shall not be spaced greater than 50 feet apart. Each grid shall meet the required signal strength level, and provide a Delivered Audio Quality (DAQ) of not less than 3.5. (DAQ 3.5 is defined as 'Speech understandable with repetition rarely required. Some noise/distortion.') A maximum of two non adjacent grids will be allowed to fail on the same floor. Failure of any two adjacent grids is considered a failure for the entire floor. Critical rooms, including, but not limited to, such areas as the fire command/control center, fire pump room, emergency generator room, stairwells with a standpipes, and other staging areas as identified by the AHJ shall not fail coverage at all. "

Sec. 105 Modify NFPA 1, O.3.10.1 to read as follows:

"The design and acceptance testing of the in-building public safety radio enhancement system shall be performed under the supervision of a Maryland registered professional engineer a minimum of 5 years of experience in the design, installation, and alignment of bi-directional amplifier systems."

Sec. 106 Modify NFPA 1, O.3.11 to read as follows:

"Maintenance. The building owner shall maintain a service contract for emergency repair of the system. The service contract shall be such that telephone support is available within 2 hours and on-site service can be provided within 24 hours of recognition that the in-building public safety radio enhancement system is not operating correctly. A copy of the contract shall be submitted to the AHJ at the time of acceptance testing. If the building owner drops the service contract, the contractor shall notify the AHJ within 24 hours."

Sec. 107 Amend NFPA 80, as referenced by NFPA 1, sections 8.4.2.1.2, 10.4.1.2, 11.4.1.2, 11.4.3.2.2, and 13.4.2 to add the following: Release of fire doors and shutters shall not be solely by fusible link and shall be accomplished by one or more of the following:

(a) Approved local smoke detection at the doors,
(b) Approved area smoke detection per NFPA 72, or
(c) Full automatic sprinkler protection per NFPA 13 with water flow interlock.

Sec. 108 Amend NFPA 96, as referenced by NFPA 1, section 1.1.1, to add an exception to read:

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In places of worship and day care facilities, protection shall be permitted to consist of the following:

(1) Electrical range with not more than four heating elements, each heating element shall be electronically controlled to limit the element temperature to below 670 degrees F.
(2) A shunt trip shall be installed for the electric range. If building is equipped with a fire alarm system, the shunt trip shall be interconnected with the fire alarm system. If the building is not equipped with a fire alarm system, other automatic means/devices, approved by DPS, to cut off power to the unit shall be installed in the kitchen.
(3) Kitchen shall be located not more than one story above the level of exit discharge.
(4) Kitchen shall be located not more than one story below the level of exit discharge.
(5) Kitchen shall be separated from adjoining areas by fire barriers with a fire resistance rating of one hour or greater; OR, the kitchen shall be protected with automatic sprinklers.

Sec. 109 Amend NFPA 92A, Section 5.3.1(2) by adding the following: At a minimum, the design shall achieve the performance objectives in the condition with two doors open simultaneously. If there is a door directly to the outside from the stair, the exterior door shall be one of the two doors used in the design.

Sec. 110 Amend NFPA 92B, Section 5.2.3.1 by adding the following: The design fire shall be not less than 5000 Btu/s (5275 kW) unless approved by the building official and the fire official.

Sec. 111 Amend NFPA 92B, Section 5.2.4 by adding the following: At the steady phase, the design fire shall be not less than 5000 Btu/s (5275 kW) unless approved by the building official and the fire official.

Sec. 112 Amend NFPA 101 Section 2.2 by adding Section 2.2.1 to read as follows: Wherever NFPA 5000 is referenced, other than for extracted text, substitute the building code that is in effect in Montgomery County.

Sec. 113 NFPA 101, section 3.3 is amended as follows:

(a) Subsection 3.3.57, add the following new subsection and definition:

3.3.57.3 Bulkhead Door. A type of door assembly covering an opening in the ground providing direct access to a basement, the floor of which is not more than 8 feet below ground level. The door consists of a single rigid leaf or two overlapping rigid leaves or covers which need to be pushed or lifted upwards in order to be opened. A person, after opening the door, can walk up a series of steps to escape to the outside.

(b) Amend Subsection 3.3.131.1 to change the definition of "Day-Care Home" by deleting the

phrase "...more than three, but..."

(c) Amend Subsection 3.3.178.4 to change the definition of "Day Care Occupancy" by deleting the phrase "...four or more ..."

(d) Amend Subsections 3.3.178.12 to change the definition of "Residential Board and Care Occupancy to replace the word "four" with "six".

Sec. 114 Amend NFPA 101, Section 4.5.8 and Section 4.6.13.1 to delete the phrase "for compliance with the provisions of this Code".

Sec. 115 Amend NFPA 101, Section 4.6.13.3 to delete the phrase "by the Code".

Sec. 116 Amend NFPA 101, section 4.8, add the following subsection:

4.8.2.4 Emergency plans shall be maintained in a location approved by the authority having jurisdiction.

Sec. 117 Amend NFPA 101, subsection 6.1.4.1 by deleting the phrase "...four or more ..."

Sec. 118 Amend NFPA 101, subsection 6.1.9.1 to change the definition of "Residential Board and Care Occupancy" to replace the word "four" with "six".

Sec. 119 Amend NFPA 101, subsection 7.2.1.5.7, add the phrase "and all stairway doors shall be unlocked simultaneously without unlatching upon a signal from the fire command center." to items (2) and (3).

Sec. 120 Amend NFPA 101, subsection 7.2.1.5.7.1, add an item (6), to read:

(6) Entry levels shall provide free access to an approved second exit. These levels shall be designated in "core/shell" building permit drawings with future tenant layouts arranged accordingly.

Sec. 121 Amend NFPA 101, Section 7.2.1.6.3 to replace the phrase "in Chapters 11 through 43" with the phrase "by the AHJ and Chapters 11 through 43".

Sec. 122 Amend NFPA 101, Section 7.2.2.1 to add the following subsection: 7.2.2.1.3 In new installations, not less than one exit stair which serves all stories of the building shall be accessible by an internal corridor from the main entrance of the building or fire department response location.

MONTGOMERY COUNTY EXECUTIVE REGULATION

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Sec. 123 Amend NFPA 101, section 7.2.2.4.5.2(1), by replacing the word "Existing" with "Interior".

Sec. 124 Delete NFPA 101, subsections 7.2.3.9.2(3)(b) and 12.2.2.2.4.

Sec. 125 Amend NFPA 101, subsection 7.3.1.2 by adding on the chart for Business Use "for calculating occupant loads in shell use business use is 65 square feet (6.0 square meters) per person."

Sec. 126 Amend NFPA 101, subsection 7.5.1.3.1 by adding new subsection 7.5.1.3.1.1:

7.5.1.3.1.1 In non-sprinklered new buildings, parallel paths of travel shall be considered remote if not less than forty (40) feet apart, or separated by assemblies having continuous one hour fire resistance with self-closing and positive latching twenty (20) minute fire protection rated opening protectives. In fully sprinklered buildings and existing buildings paths of travel shall be considered remote if not less than thirty (30) feet apart, or separated by assemblies with self-closing opening protectives which are resistant to the passage of smoke. This minimum separation of paths shall not supersede minimum separation of exits or doors in 7.5.1.3.2.

Sec. 127 NFPA 101, subsection 7.7.2.3 is amended by adding two sentences at the end of the section as follows:

In new installations, the door to the exterior of the building shall be in direct sight of the point of the termination of the exit. For the purposes of this section, in new installations, the use of exit signs or other exit markings shall not be considered as making the way to the exterior "readily visible and identifiable".

Sec. 128 NFPA 101, Subsection 7.9.1.2, replace the word "only" in the first sentence with "but not limited to,".

Sec. 129 Amend NFPA 101, subsection 7.10.8.3.1 by adding: If the sign is on the door, then the door must be equipped with an approved self-closing device.

Sec. 130 Amend NFPA 101, subsection 8.6.6(3) by adding a second sentence:

Areas shall be considered to satisfy the requirements of 'readily obvious' when the communicating space is provided with automatic smoke detection and alarm in accordance with NFPA 72.

Sec. 131 NFPA 101, subsection 8.6.7(6)(b) at the end of the sentence add the phrase "in a location approved by the AHJ".

Sec. 132 Amend NFPA 101 by adding new section 9.1.5 as follows:

9.1.5 In-Building Public Safety Radio Enhancement System

9.1.5.1 All newly constructed below ground floors of a building, all floors in buildings greater than 25,000 ft² per floor, and all floors of buildings greater than 3 stories in height shall meet minimum emergency radio communication system performance criteria adopted by Montgomery County. Proof that minimum performance criteria are met shall be provided in writing to the Fire Chief.

(1) System performance testing shall be performed in accordance with technical standards for systems and testing personnel established by Montgomery County.

(2) Compliance testing shall be performed at time of occupancy.

(3) Field testing may be performed upon reasonable notification of the owner or occupant by any authorized fire and rescue personnel.

Exception: One and two family dwellings and town homes.

9.1.5.2 In existing buildings, where emergency radio communication system performance is reported to be inadequate, the Fire Marshal shall be permitted to require a technical analysis to determine the level of performance of the emergency radio communication system. Where the analysis demonstrates unacceptable performance, an in-building public safety radio enhancement system shall be provided.

9.1.5.3 Where installed to achieve the minimum emergency radio communication system performance criteria, an in-building public safety radio enhancement system shall be designed in accordance with Annex O of NFPA 1, as amended.

9.1.5.4 All testing, design, installation, inspection, and maintenance required by Section 9.1.5 shall be performed by personnel approved by the Fire Marshal.

Sec. 133 Amend NFPA 101, subsections 9.6.1.6 and 9.7.6.1 by add: When a property owner or the owner's agent cannot be contacted to establish a fire watch, the Montgomery County Fire and Rescue Service at their discretion may provide the fire watch and charge the property owner the inspection overtime rate per person per hour.

Sec. 134 NFPA 101, subsection 9.6.2.6 is amended as follows:

(a) Add the following sentence to the end of the section: "This paragraph does not permit the omission of manual fire alarm boxes in accordance with other provisions of this subsection unless specifically permitted by Chapters 11 through 43."

(b) Add two new subsections as follows:

9.6.2.6.1 Zoned fire alarm systems shall have manual pull stations located at the entrance to each exit enclosure and at the main exit.

9.6.2.6.2 When a fire alarm system is required in a multiple tenant building, for each tenant exiting directly to the exterior of the building, a manual pull station and approved occupant notification shall be located at each required or marked exit.

Sec. 135 Amend NFPA 101, Section 9.6.2.9 to add the following sentence: "In environments not suitable for smoke detectors, alternate means of detection shall be provided and shall comply with NFPA 72 Section 4.4.4.1."

Sec. 136 NFPA 101, add new subsection 9.6.2.11 to read: "Where required by another section of this code, carbon monoxide alarms or carbon monoxide detectors shall be installed in accordance with NFPA 720."

Sec. 137 Amend NFPA 101, Section 9.6.3.2.1 to delete the phrase "lobby,".

Sec. 138 Amend NFPA 101, Section 9.6.3.4, to adding the following at the end of the sentence: "only when the initial fire alarm signal is automatically transmitted without delay to a listed central station in accordance with 9.6.4."

Sec. 139 NFPA 101, Section 9.6.3.7, add a second sentence to read: "Required audibility shall be met with all intervening doors (between any space and the audible devices) closed."

Sec. 140 Amend NFPA 101, Section 9.6.3.9 by adding: Where voice type occupant notification is used, automatic pre-recorded messages shall be used complying with Section 9.6. Live voice as the sole notification method is prohibited.

Exception: Previously "approved" live voice systems, shall be permitted to remain.

Sec. 141 Amend NFPA 101, Section 9.6.4.2 by deleteing the list of four items and replace the phrase "any of the following means acceptable to the authority having jurisdiction" with "by a listed central station fire alarm system".

Sec. 142 NFPA 101, delete subsection 9.6.4.3.

Sec. 143 NFPA 101, subsection 9.6.5.2(3), add the following sentence: "Manual fire alarm initiation shall not activate floor or zone-dependent smoke control systems."

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Sec. 144 NFPA 101, delete subsection 9.6.7.4.3

Sec. 145 Amend NFPA 101, Section 9.7.1.1 to add the following subsection: 9.7.1.1.1 For new installations, drop-out ceilings as referenced in NFPA 13, Subsections 8.15.14 shall be prohibited.

Sec. 146 NFPA 101, subsection 9.7.2.2, the first sentence is amended to read: "Where supervised automatic sprinkler protection is required by another section of this Code, waterflow alarms shall be automatically transmitted to a listed central station."

Sec. 147 NFPA 101, subsection 9.7.3.1 is amended to read: "Where water as an extinguishing agent is not compatible with the fire hazard or is prohibited by law, statute or ordinance, the affected area shall be equipped with an approved automatic fire suppression system utilizing a suppression agent that is compatible with the fire hazard. Such system shall be installed in accordance with the appropriate standard as determined in Table 9.7.3.1."

Sec. 148 NFPA 101, Section 9.7.5 delete the phrase "required by this Code".

Sec. 149 Amend NFPA 101, Section 11.8.3.1 by adding the phrase "except for existing high-rise apartment occupancy buildings" at the end of the first sentence.

Sec. 150 NFPA 101, subsection 11.8.4.1, add new subsection 11.8.4.1.1:

11.8.4.1.1 In buildings having staged evacuation the voice fire alarm system shall send a predetermined message to the floor where the alarm originated, to the floor immediately below and to the floor immediately above, providing information and direction to the occupants. Any subsequent alarm(s) on other than the initial fire floor must initiate the voice fire alarm as described above. The voice fire alarm shall be designed to be heard clearly by all occupants within the designated portions thereof as required by Section 9.6, but it shall not sound automatically in elevator cars and enclosed exit stairways. Communicating levels shall be considered one floor/fire area for the audible and visual fire alarm signals.

Sec. 151 Amend NFPA 101, section 11.8.6.1, add a new subsection 11.8.6.1.1 to read:
"In new installations, the emergency command center shall have a door directly to the exterior of the building on the address side. The exterior door to the emergency command center shall be within 50 feet of a fire department access road. A fire department access box shall be provided within 6 feet of the door to the emergency command center. The exterior door to the emergency command center shall be identified on the exterior face as the emergency command center in a manner acceptable to the Fire Chief."

Sec. 152 NFPA 101, subsections 11.8.6.2 (8) and (10), are amended to read as follows:

(8) Emergency generator status indicators, and remote starting.

(10) Fire pump status indicators and remote starting.

Sec. 153 NFPA 101, subsection 11.8.6, add a new subsection 11.8.6.3 to read: "The emergency command center shall also comply with the provisions of Section 911 of the International Building Code, 2009 edition.

Sec. 154 Amend NFPA 101, Section 11.11.2.1 to add the phrase "or other approved testing standard approved by the State Fire Marshal".

Sec. 155 Amend NFPA 101, Section 12.2.4.1 is amended by completely replacing the text with the following:

12.2.4.1 Exits shall comply with the following, except as otherwise permitted by 12.2.4.4:
(1) The number of means of egress shall be in accordance with Section 7.4.
(2) Not less than two separate exits shall be provided on every story.
(3) Not less than two separate exits shall be accessible from every part of every story.

Sec. 156 NFPA 101, subsection 14.2.11.1.1(1) is amended by adding the following after "...tools", "keys, special knowledge, or excessive force."

Sec. 157 Amend NFPA 101, sections 16.1.1 and 17.1.1, to add subsections 16.1.1.6 and 17.1.1.6 as follows: Day-care centers providing day care for school age children before and after school hours in a building which is in use as a public or private school are not required to meet the provisions of this chapter, but shall meet the provisions for educational occupancies.

Sec. 158 NFPA 101, subsections 16.2.11.1.1 and 17.2.11.1.1 to add the following item:

(4) For windows at grade the minimum net clear opening shall be permitted to be 5.0 square feet.

Sec. 159 Amend NFPA 101, subsection 16.2.11.1.2, to add the following item to the list:

(3) Group Day-Care Homes and Family Day-Care Homes which are protected by hard-wired, interconnected smoke alarms or detectors in each room or space of the building (including corridors). Such smoke alarms or detectors are not necessary in bathrooms, closets, attached garages, or attic spaces without storage. In addition, if the building's furnace, hot water heater, and/or clothes dryer is fueled by natural gas or propane gas, then these areas shall be protected by sprinklers supplied by the domestic system.

Sec. 160 Amend NFPA 101, subsections 16.3.4.5 and 17.3.4.5 to add the following exception:

Exception: Day-care occupancies located in school facilities where enrollment is limited to children capable of self preservation, where no sleeping facilities are provided and the school is provided with approved full automatic sprinkler protection.

Sec. 161 NFPA 101, add new subsection 16.3.5.4 to read: Buildings containing new day care centers above or below the level of exit discharge shall be protected throughout with full automatic sprinkler protection installed in accordance with section 9.7.

Sec. 162 NFPA 101, subsections 16.6.1.1.2, and 17.6.1.1.2, delete the phrase "...more than 3, but.."

Sec. 163 NFPA 101, subsections 16.6.1.4.1.1, 16.6.1.4.1.2, 17.6.1.4.1.1 and 17.6.1.4.1.2 are amended as follows:

(a) Subsections 16.6.1.4.1.1 and 17.6.1.4.1.1, delete the phrase "more than three but" and replace the phrase "seven clients" with "nine clients".

(b) Subsections 16.6.1.4.1.2 and 17.6.1.4.1.2, change the phrase "at least seven" to "at least nine."

Sec. 164 NFPA 101, subsections 16.6.1.7.1 and 17.6.1.7.1, replace items (1) and (2) with the following items:

(1) The minimum staff-to-client ratio shall be not less than one staff for up to eight clients, including the caretaker's own children incapable of self-preservation.

(2) There shall be not more than four clients incapable of self-preservation, including the caretaker's own children incapable of self-preservation.

(3) A staff-to-client ratio of at least one staff to every two clients incapable of self-preservation shall be maintained at all times.

(4) The staff-to-client ratio shall be permitted to be modified by the authority having jurisdiction where safeguards in addition to those specified in this section are provided.

Sec. 165 NFPA 101, subsection 16.6.2.1 and 17.6.2.1, add the following sentence: "Bulkhead doors shall not be permitted to serve as a primary means of escape."

Sec. 166 NFPA 101, subsections 16.6.2.2 (Reserved) and 17.6.2.2 (Reserved) are amended as follows:

SLIDING DOOR.

For family day-care homes, a sliding door used as a required means of egress shall comply with the following conditions:

(1) The sliding door shall have not more than one, easily operated, locking device that does not require special knowledge, effort, or tools to operate;
(2) There may not be draperies, screens, or storm doors that could impede egress;
(3) The sill or track height may not exceed 1/2 inch above the interior finish floor;
(4) The surface onto which exit is made shall be an all weather surface such as a deck, patio, sidewalk, etc;
(5) The floor level outside the door may be one step lower than the inside, but not more than 8 inches lower:
(6) The sliding door shall open to a clear open width of at least 28 inches;
(7) Before day care use, each day the sliding door shall be unlocked and tested to the full required width to be sure it is operating properly, and the door shall be nonbinding and slide easily;
(8) During periods of snow or freezing rain, door tracks shall be cleared out and the door opened periodically throughout the day in order to ensure proper operation.

Sec. 167 NFPA 101, subsections 16.6.2.3 (Reserved) and 17.6.2.3 (Reserved) are amended as follows:

SPECIAL MEANS OF ESCAPE REQUIREMENTS: For family day-care homes, dead-bolt locks shall be provided with approved interior latches, or these locks shall be of a captured key design from which the key cannot be removed from the interior side of the lock when the lock is in the locked position. These locks shall be unlocked at all times when the home is occupied for the purpose of family day care. Exception: A double-keyed dead-bolt lock may be used on the secondary means of escape if the key is readily accessible and the lock is unlocked at all times the home is occupied for the purpose of family day care.

Sec. 168 NFPA 101, subsection 16.6.3.4 add the following subsection:

16.6.3.4.4 Approved battery-powered smoke alarms rather than house electrical service-powered smoke alarms required by 16.6.3.4.3 shall be permitted where the facility has testing, maintenance and battery replacement programs that ensure reliability of power to the smoke alarms.

Sec. 169 NFPA 101, subsections 16.7.4.1 and 17.7.4.1 add an Exception:

Exception: Day-Care Homes.

Sec. 170 NFPA 101, subsections 16.7.5 and 17.7.5, add an Exception:

Exception: Day-Care Homes with no more than three clients for overnight lodging.

Sec. 171 NFPA 101, subsection 17.2.11.1.2 add the following item to the list:

(3) Group Day-Care Homes and Family Day-Care Homes which are:
(a) Protected by hard-wired, interconnected smoke alarms or detectors in each room or space of the building (including corridors). Such smoke alarms or detectors are not necessary in bathrooms, closets, attached garages, or attic spaces without storage; and,
(b) When the building's furnace, hot water heater, and/or clothes dryer is fueled by natural gas or propane gas, these areas are protected by sprinklers supplied by the domestic system.

Sec. 172 Amend NFPA 101 as follows:
(a) Subsection 17.6.3.4.4, delete "Existing..."
(b) Section 22.4.5.1.3 to delete the phrase "or 22.4.5.1.5".
(c) Sections 22.4.5.1.4(1) and 23.4.5.1.4(1) to replace the phrase "2 minutes" with "30 seconds".
(d) Sections 22.4.5.1.4(2) and 23.4.5.1.4(2) to replace the phrase "2 minute" with "30 seconds".
(e) Delete NFPA 101, Sections 22.4.5.1.5 and 23.4.5.1.5.
(f) Delete NFPA 101, Sections 22.4.5.2 and 23.4.5.2.
(g) Section 23.4.5.1.3 to delete the phrase "or 23.4.5.1.5".

Sec. 173 Amend NFPA 101, subsection 24.1.1.1 to replace the word "three" with "five" and to delete the phrase ",if any, accommodated in rented rooms".

Sec. 174 Amend NFPA 101, subsections 24.2.2.3.3, 32.2.2.3.1(3), and 33.2.2.3.1(3) to insert the phrase ", not less than 5.0 ft^2 when at grade" after the phrase "5.7 ft^2".

Sec. 175 NFPA 101, subsection 24.3.4.3, add at the end of the sentence, "...only if the existing smoke alarms are battery operated."

Sec. 176 NFPA 101, add new subsection 24.3.4.4 to read: Carbon monoxide alarms or detectors shall be installed in any dwelling unit containing a fuel burning appliance, fireplace, or having an attached garage.

Sec. 177 NFPA 101, subsection 26.1.1.1, change "buildings" to "buildings that do not qualify as one- and two-family dwellings".

Sec. 178 NFPA 101, add new subsections 26.3.4.7, 28.3.4.7, 30.3.4.7, 32.2.3.4.5, and 32.3.3.4.10 to read: "Carbon monoxide alarms or detectors shall be installed as follows:

(a) In any dwelling unit or sleeping unit, where the unit is served by or contains a fuel burning appliance or fireplace; and
(b) In common areas, where the common areas are served by a fuel burning appliance or fire

place."

Sec. 179 NFPA 101, subsection 28.3.4.1 is amended by changing "28.3.4.6" to "28.3.4.7".

Sec. 180 NFPA 101, subsection 28.3.4.3.5, in only the first sentence, delete all wording after "provided".

Sec. 181 NFPA 101, delete subsections 29.3.4.5.2 and 31.3.4.5.2.

Sec. 182 Amend NFPA 101, Section 30.2.4.1, after the word "exits" insert the phrase "which are provided on every story and which are"

Sec. 183 Amend NFPA 101, Section 30.3.4.3.2 to delete phrase "unless the building complies with either 30.3.4.3.3 or 30.3.4.3.4".

Sec. 184 NFPA 101, delete subsections 30.3.4.3.3 and 30.3.4.3.4.

Sec. 185 Delete NFPA 101, Section 31.3.5.12

Sec. 186 NFPA 101, Sections 32.7.3.6 and 33.7.3.6 add a sentence as follows: "If more than three residents are not able to participate in the drill, the facility shall be considered as a Health Care Occupancy and shall be reevaluated in accordance with Section 43.7.

Sec. 187 NFPA 101, subsections 33.2.3.4.3.5 and 33.3.3.4.7.1, add at the end of the sentence, "...and have secondary battery back-up power."

Sec. 188 NFPA 101, subsection 36.3.4.1 and 37.3.4.1 are amended to read as follows: General. Class A mercantile occupancies and multiple story Class B mercantile occupancies shall be provided with a fire alarm system in accordance with section 9.6.

Sec. 189 NFPA 101, subsection 36.4.4.4.3.2, to add "where approved alternative visible means of occupant notification is provided".

Sec. 190 Delete NFPA 101, Sections 36.4.4.8(1)(b) and 37.4.4.8(1)(b).

Sec. 191 NFPA 101, subsections 38.2.4.7 and 39.2.4.7, are added as new sections to read as follows:

Any two story business occupancy building not exceeding 3000 square feet gross floor area per floor shall be permitted a single exit with an approved outside stairway, or a single totally enclosed interior stairway to the second floor having discharge directly outside the building, if the total travel distance to the outside of the building does not exceed 100 feet, the travel distance to the interior stairway does not exceed 75 feet, and such interior stairway does not communicate with any other floor. An interior single exit stairway shall be permitted to be

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arranged as a floor communicating stair, with one (1) hour fire resistance rated opening protectives at the entrances from each level, and protection provided as follows: The building shall be provided with a non-supervised AC hard-wired smoke detection and alarm system in accordance with NFPA 72, arranged to sound an alarm audible throughout each level, and the stairway shall be provided with approved automatic sprinkler protection, with sprinklers located at the top of the stair and over each landing and on the tenant side of each interior fire door leading to the stairway, in accordance with NFPA 13.

Sec. 192 Amend NFPA 101, Section 38.3.2.1 by adding Section 38.3.2.1.1 to read as follows:

38.3.2.1.1 General storage areas with a floor area not greater than 100 square feet shall be exempt from the provisions of 8.7.

Sec. 193 NFPA 101, subsection 39.2.2.2.4 is amended to read: "The re-entry provisions of 7.2.1.5.7 shall apply."

Sec. 194 Amend NFPA 101, Section 39.3.2.1 by adding Section 39.3.2.1.1 to read as follows:

39.3.2.1.1 General storage areas with a floor area not greater than 100 square feet shall be exempt from the provisions of 8.7.

Sec. 195 NFPA 101, subsection 39.3.4.3(2) is amended to read: "Sound an audible alarm in a constantly attended location and transmit a signal to a listed Central Station."

Sec. 196 NFPA 101, subsections 40.3.4.3.1, 42.3.4.3.1 and 42.8.3.4.3.1 are amended to read: "The required fire alarm system shall provide occupant notification in accordance with 9.6.3."

Sec. 197 Amend NFPA 101, Sections 42.3.4.1.2 and 42.3.4.1.3 to replace the phrase "Storage occupancies" with "Storage occupancies less than three stories".

Approved,

Isiah Leggett,
County Executive

Approved as to form and legality
Montgomery County, Md. County Attorney's Office

MONTGOMERY COUNTY EXECUTIVE REGULATION

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Montgomery County Regulation on:

FIRE SAFETY CODE - BUILDING CONSTRUCTION
Montgomery County Department of Permitting Services

Issued By: County Executive
Regulation No: 10-12
Authority: Code Section 22-13
Council Review: Method 2 under Code Section 2A-15
Register Vol. 29, Issue 4
Comment Deadline: April 30, 2012
Effective Date:
Sunset Date: None

SUMMARY: This regulation adopts the applicable editions of various National Fire Protection Association (NFPA) standards – most notably NFPA 1, Uniform Fire Code and NFPA 101, Life Safety Code – as adopted by the Maryland State Fire Prevention Code. These codes and the associated codes and standards incorporated by reference are adopted to set the minimum requirements to establish a reasonable level of safety from the hazards created by fire, explosion, and dangerous conditions. The changes do not retroactively apply to unaltered existing buildings, existing systems or existing conditions permitted or approved before the date of adoption of this regulation unless an inimical hazard exists.

The Department of Permitting Services has been delegated the authority by the Fire Chief (of Montgomery County Fire and Rescue Services) to adopt regulations pursuant to Chapter 22 of the Montgomery County Code in the cases of a new building, a new system, or new conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

ADDRESSES: Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, MD 20850

STAFF: For further information, contact Mike Pokorny, Senior Permitting Services Specialist, Division of Building Construction, 240-777-6235.

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Subject: FIRE SAFETY CODE – BUILDING CONSTRUCTION	Number: 10-12
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Sec. 1 In accordance with the procedures authorized in Chapter 22, "Fire Safety Code," of the Montgomery County Code, 1996, this Executive Regulation applies to the safeguarding of life, property, and the public welfare from the hazards of fire and explosion arising from the improper storage, handling, or use of substances, materials, or devices and from conditions hazardous to life, property, and the public welfare in the use or occupancy of buildings, structures, sheds, tents, lots or premises.

In this regulation the term "Fire Chief" means the Fire Chief of the Montgomery County Fire and Rescue Service and includes the Fire Chief's designees.

The Department of Permitting Services has been delegated authority by the Fire Chief to enforce the requirements of the Montgomery County Fire Safety Code as it pertains to new facilities, elements, structures, and conditions.

Existing buildings, existing systems, or existing conditions which are altered are subject to this regulation to the extent required by the Maryland Building Rehabilitation Code, the Montgomery County Fire Safety Code, and the Maryland State Fire Prevention Code. Unaltered existing buildings, existing systems, or existing conditions are not subject to this regulation.

Sec. 2 Unless otherwise noted, all references to the National Fire Codes and Standards adopted in these regulations are to those codes, standards, recommended practices and manuals in the National Fire Codes, published by the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. The references to these National Fire Codes and Standards are set forth in Section 22-14 of the Montgomery County Code, 1996.

Terms used in this regulation which are defined in the state adopted consensus codes shall have the definitions of the consensus code.

Sec. 3 Standards Adopted. The following standards published by the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269, are incorporated in these regulations except as expressly amended. The dates or editions of the individual codes and standards are as listed in this section.

NFPA No.	CODE OR STANDARD
1	Uniform Fire Code – 2009 edition
42	Code for the Storage of Pyroxylin Plastic – 2002 edition
101	Life Safety Code – 2009 edition

130	Standard for Fixed Guideway Transit and Passenger Rail Systems – 2007 edition
214	Standard on Water Cooling Towers – 2005 edition
720	Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment – 2009 edition
850	Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations – 2005 edition

Sec. 4 The Fire Chief must review this regulation and propose amendments within six months after the date the State Fire Prevention Commission adopts new amendments to NFPA 1 and NFPA 101 into the State Fire Prevention Code.

Sec. 5 Delete NFPA 1, Section 1.9.

Sec. 6 Delete NFPA 1, Section 1.10.

Sec. 7 Delete NFPA 1, Subsection 1.11.3.

Sec. 8 Amend NFPA 1, Section 1.12.1, add a new subsection 1.12.1.1 as follows: 1.12.1.1 Permits, certificates, notices, approvals or orders required by this code shall be governed by the policies and procedures of the AHJ.

Sec. 9 Amend NFPA 1, Section 1.12.7 to change the word "shall" to "may".

Sec. 10 Amend NFPA 1, Section 2.2 to delete the referenced publication NFPA 5000 Building Construction and Safety Code, 2009 edition. Wherever NFPA 5000 is referenced, other than for extracted text, substitute the building code adopted by Montgomery County.

Sec. 11 Amend NFPA 1, Section 3.3.115 to add "and as referenced in Public Safety Article Section 10-101, Annotated Code of Maryland."

Sec. 12 Amend NFPA 1, Section 3.3.170.6 to delete phrase "more than 3 but".

Sec. 13 Amend NFPA 1, Section 3.3.170.7 and Section 6.1.4.1 to delete phrase "four or more".

Sec. 14 Amend NFPA 1, Section 3.3.170.20 to replace the word "three" with "five" and delete the phrase ", if any, accommodated in rented rooms."

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Sec. 15 Amend NFPA 1, Section 3.3.170.23 and Section 6.1.9.1 to replace the word "four" with "six".

Sec. 16 Amend NFPA 1, Section 4.5.8.1 and Section 10.4.1 to delete the phrase "for compliance with the provisions of this Code".

Sec. 17 Amend NFPA 1, Section 4.5.8.3 and Section 10.4.3 to delete the phrase "by the Code".

Sec. 18 Amend NFPA 1, Section 10.1.2 to add the phrase "except as amended by COMAR 29.06.01.07, COMAR 29.06.01.08, and COMAR 29.06.01.09".

Sec. 19 Amend NFPA 1, Section 10.5.1 to replace "AHJ" with "AHJ or incident commander".

Sec. 20 Amend NFPA 1, Section 10.11.6 to replace "grill" with "gas-fired, charcoal or electric grill" and "10 feet (3 meters)" with "20 feet (6.1 meters)"

Sec. 21 Delete NFPA 1, Section 10.11.6.1

Sec. 22 Amend NFPA 1, Subsection 10.12.1 to add the following Subparagraph and Paragraph:

10.12.1.1.1 Subject to the approval of the AHJ, individual suites within structures and rear exterior entrances and/or access from service corridors shall be clearly identified.

10.12.1.4 Where required by the AHJ, symbols in compliance in with NFPA 170, Standard for Fire Safety and Emergency Symbols, shall be used.

Sec. 23 Amend NFPA 1, Sections 10.12.1.2 and 10.12.1.3 to replace "address numbers" with "premises identification".

Sec. 24 Replace NFPA 1, Table 10.14.1.1 with the following table:

Occupancy	No Trees Permitted	Cut Tree Permitted with Automatic Sprinkler Systems	Cut Tree Permitted without Automatic Sprinkler Systems	Balled Tree Permitted
Ambulatory Health Care		X	X	X
Apartment Buildings		Within Unit	Within Unit	X
Assembly		X	X	X
Board and Care		X		X
Business		X	X	X

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Day Care Centers		X		X
Day Care Family		X	X	X
Detention and Correctional	X			
Dormitories		X	X	X
Educational	X			
Health Care		X	X	X
Hotels		X	X	X
Industrial		X	X	X
Lodging and Rooming		X	X	X
Mercantile		X	X	X
One- and Two- Family		X	X	X
Storage		X	X	X

Sec. 25 Amend NFPA 1, Section 10.14.1 to add the following new paragraph

10.14.1.2 The AHJ shall:
(1) Approve the placement of a natural cut or balled tree;
(2) Limit the number of natural cut or balled trees displayed; and
(3) Order the removal of any tree if the tree poses a hazard to life or safety.

Sec. 26 Amend NFPA 1, Paragraph 10.14.3.1 to replace "by the manufacturer as being fire retardant" with "by a tested laboratory recognized by the Office of the State Fire Marshal".

Sec. 27 Amend NFPA 1, Section 10.14.9.1 to replace "1/2 inch (13 mm)" with "2 inches (50 mm)" and add the following sentence: "A natural cut tree shall not exceed 10 feet (3 m) in height, excluding the tree stand."

Sec. 28 Amend NFPA 1, Section 10.15.2 to insert the phrase ", but not limited to," after the words "such as".

Sec. 29 Amend NFPA 1, Section 10.15.11.2.6 to replace "any vehicles" with "any vehicles, buildings."

Sec. 30 Amend NFPA 1, Section 10.15.11.3.1 add the following at the end of the section "or within the fuel break described in Section 10.15.11.2.6."

Sec. 31 Amend NFPA 1, Section 10.16, add a new subsection 10.16.6 as follows:

10.16.6 The AHJ shall have the authority to require that outdoor storage of any combustible material be enclosed by an approved fence or other protective enclosure to prevent unauthorized access.

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Sec. 32 Amend NFPA 1, Section 10.16.1 to replace "10 ft (3 m)" with "15 ft (4.6 m)" and to replace "property line" with "property line, building, or adjacent pile of combustible material".

Sec. 33 Amend NFPA 1, Section 10.16.3 to add the following:
The separation distance shall be allowed to be increased where the AHJ determines that a higher hazard to the adjoining property exists.

Sec. 34 Amend NFPA 1, Section 10.16.5 to add the phrase "and 10,000 ft^2 in area".

Sec. 35 Amend NFPA 1, Section 11.1 to add the following subsection:

11.1.11 Clearance. A clear space of not less than 30 inches (762 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided in front of electrical service equipment. Where the electrical service equipment is wider than 30 inches (762 mm), the clear space shall not be less than the width of the equipment. No storage of any materials shall be located within the designated clear space. Exception: Where other specialized dimensions are required or permitted by NFPA 70.

Sec. 36 Add NFPA 1, Sections 11.1.9.2.1 and 11.1.9.2.2 to read:

11.1.9.2.1 In new buildings, excluding one and two family dwellings, a shunt trip to disconnect the electrical service to the building shall be provided as follows:

(a) In the emergency command center, where an emergency command center is in the building.
(b) At the fire alarm annunciator, where there is a fire alarm annunciator and where there is no emergency command center.
(c) In an appropriately sized and weatherproof fire department access box on the address side of the building, where there is no emergency command center or fire alarm annunciator.

11.1.9.2.2 In existing buildings, excluding one and two family dwellings, where there are significant upgrades to the building electrical service, such as modifying or replacing the switchgear, a disconnecting means shall be provided as for new installations.

Sec. 37 Amend NFPA 1, Paragraph 11.1.9.3 to add the following subparagraph:

11.1.9.3.3 Doors to electrical control panel rooms shall be marked with a plainly visible and legible sign stating ELECTRICAL ROOM or similar approved wording in contrasting letters not less than 1 inch (25 mm) high and not less than ¼ inch (6.4 mm) in stroke width.

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Sec. 38 Amend NFPA 1, subsection 11.9.1 to replace "approved by the fire department" with "approved by the AHJ".

Sec. 39 Amend NFPA 1, Section 11.9.1 to add the following subsections:

11.9.1.1 In new installations, the emergency command center shall have a door directly to the exterior of the building on the address side. The exterior door to the emergency command center shall be within 50 feet of a fire department access road. A fire department access box shall be provided within 6 feet of the door to the emergency command center. The exterior door to the emergency command center shall be identified on the exterior face as the emergency command center in a manner acceptable to the Fire Chief.

11.9.1.2 In new installations, the emergency command center shall also comply with the provisions of Section 911 of the International Building Code, 2009 edition.

Sec. 40 Amend NFPA 1, Section 11.9.5(8) to read as follows:

(8) Fire pump status indicators and remote starting.

Sec. 41 Amend NFPA 1, Sections 13.1.9, 13.1.10 and 13.7.1.4.4 to add: When a property owner or the owner's agent cannot be contacted to establish a fire watch, the Montgomery County Fire and Rescue Service at their discretion may provide the fire watch and charge the property owner the inspection overtime rate per person per hour.

Sec. 42 Amend NFPA 1, Section 13.2.2.2 to delete the existing wording and replace with the following: All new buildings shall be equipped with an approved standpipe system where required by the building code adopted by Montgomery County. Where a Class III system is required, a Class I system shall be permitted.

Sec. 43 Amend NFPA 1, Section 13.3.1.2 to add the following subsection:

13.3.1.2.1 For new ceiling installations, drop-out ceilings as referenced in NFPA 13, Subsection 8.15.14 shall be prohibited.

Sec. 44 Amend NFPA 1, Section 13.3.1.7.2 to read: "Where supervised automatic sprinkler protection is required by another section of this Code, waterflow alarms shall be automatically transmitted to a listed central station."

Sec. 45 Amend NFPA 1, Section 13.3.2.1 to add the following subsection:

13.3.2.1.1 All new buildings shall be equipped with automatic sprinkler system or other

automatic fire suppression system where required by Section 903 of the building code adopted by Montgomery County. Exception: Day care facilities that comply with the sprinkler requirements of the NFPA 101 Life Safety Code (2009 edition).

Sec. 46 Amend NFPA 1, Section 13.3.2.24.2 by adding at the beginning of the section the phrase "Except as modified by 13.3.2.24.4," and adding a new subsection 13.3.2.24.2.4 which reads:

13.3.2.24.2.4 The requirement of 13.3.2.24.2 shall not apply to existing apartment occupancy high-rise buildings.

Sec. 47 Amend NFPA 1, Sections 13.3.3.1 and 13.3.3.2 to delete the phrase "installed in accordance with this Code."

Sec. 48 Amend NFPA 1, Section 13.4.1 to add the following subsection:

13.4.1.1.1 No fire pump component, including the pump, driver, or controller, shall be permitted to be installed in below ground vaults or pits unless otherwise approved by the AHJ.

Sec. 49 Amend NFPA 1, Section 13.5.2 to add the following phrase at the end of the section "as modified by Montgomery County Executive Regulation 29-08AM 'Fire Safety Code – Fire Department Apparatus Access and Water Supply'".

Sec. 50 Amend NFPA 1, Section 13.6.2 to add the phrase ", unless otherwise permitted by the AHJ."

Sec. 51 Amend NPFA 1, Section 13.7.1.4.8.6 is amended as follows:

(a) Add the following sentence to the end of the section: "This paragraph does not permit the omission of manual fire alarm boxes in accordance with other provisions of this subsection unless specifically permitted by Chapters 11 through 43.

(b) Add two new subsections as follows:

13.7.1.4.8.6.1 Zoned fire alarm systems shall have manual pull stations located at the entrance to each exit enclosure and at the main exit.

13.7.1.4.8.6.2 When a fire alarm system is required in a multiple tenant building, for each tenant exiting directly to the exterior of the building, a manual pull station and approved occupant notification shall be located at each required or marked exit.

Sec. 52 Amend NFPA 1, Section 13.7.1.4.8.9 to add the following sentence: "In environments not suitable for smoke detectors, alternate means of detection shall be provided and shall comply

with NFPA 72 Section 4.4.4.1."

Sec. 53 Amend NFPA 1, Section 13.7.1.4.10.2.1, delete the phrase "lobby,".

Sec. 54 Amend NFPA 1, Section 13.7.1.4.10.4 by adding the following at the end of the sentence: "only when the initial fire alarm signal is automatically transmitted without delay to a listed central station in accordance with 13.7.1.4.11."

Sec. 55 Amend NFPA 1, Section 13.7.1.4.10.7 by adding a second sentence to read: "Required audibility shall be met with all intervening doors (between any space and the audible devices) closed."

Sec. 56 Amend NFPA 1, Section 13.7.1.4.10.9 by adding: Where voice type occupant notification is used, automatic pre-recorded messages shall be used complying with Section 13.7. Live voice as the sole notification method is prohibited – except that previously "approved" live voice systems shall be permitted to remain.

Sec. 57 Amend NFPA 1, Section 13.7.1.4.11.2 by deleting the list of four items and replace the phrase "any of the following means acceptable to the authority having jurisdiction" with "by a listed central station fire alarm system".

Sec. 58 Delete NFPA 1, Section 13.7.1.4.11.3.

Sec. 59 Amend NFPA 1, Section 13.7.1.4.12.2(3) by adding the following sentence: "Manual fire alarm initiation shall not activate floor or zone-dependent smoke control systems."

Sec. 60 Delete NFPA 1, Section 13.7.1.4.14.10.3

Sec. 61 Delete NFPA 1, Sections 13.7.2.10.2.2 and 13.7.2.12.3.2

Sec. 62 Amend NFPA 1, Section 13.7.2.14.4 to add at the end of the sentence, "...only if the existing smoke alarms are battery operated."

Sec. 63 Amend NFPA 1, Section 13.7.2.16.1.4.4 and Section 13.7.2.16.2.2.1 by adding at the end of the sentence, "...and have secondary battery back-up power."

Sec. 64 Amend NFPA 1, Section 13.7.2.17.1 and Section 13.7.2.18.1 are amended to read as follows: Class A mercantile occupancies and multiple story Class B mercantile occupancies shall be provided with a fire alarm system in accordance with Section 13.7 and NFPA 101.

Sec. 65 Amend NFPA 1, Section 13.7.2.22.1.2 and Section 13.7.2.22.1.3 to replace the phrase "Storage occupancies" with "Storage occupancies less than three stories".

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Sec. 66 Amend NFPA 1, Sections 13.7.2.23.2 and 13.7.2.24.2 to add the following exception:

Exception: Day-care occupancies located in school facilities where enrollment is limited to children capable of self preservation, where no sleeping facilities are provided and the school is provided with approved full automatic sprinkler protection.

Sec. 67 Amend NFPA 1, Section 13.7.2.23.3 to add the following subsection:

13.7.2.23.3.4 Approved battery-operated smoke alarms, rather than house electrical service-powered smoke alarms required by 13.7.2.23.3.3, shall be permitted where the facility has testing, maintenance, and battery replacement programs that ensure reliability or power to the smoke alarms.

Sec. 68 Amend NFPA 1, Section 13.7.2.24.3.4 to delete the word "existing".

Sec. 69 Amend NFPA 1, Section 13.7.2.27.2.1 by adding a new subsection 13.7.2.27.2.1.1 as follows:

13.7.2.27.2.1.1 In buildings having staged evacuation the voice fire alarm system shall send a predetermined message to the floor where the alarm originated, to the floor immediately below and to the floor immediately above, providing information and direction to the occupants. Any subsequent alarm(s) on other than the initial fire floor must initiate the voice fire alarm as described above. The voice fire alarm shall be designed to be heard clearly by all occupants within the designated portions thereof as required by Section 9.6, but it shall not sound automatically in elevator cars and enclosed exit stairways. Communicating levels shall be considered one floor/fire area for the audible and visual fire alarm signals.

Sec. 70 Add NFPA 1, Section 13.9 to read as follows: "In new buildings, an emergency command center in accordance with Section 11.9 shall be required in buildings, other than parking garages, with a gross floor area greater than 100,000 square feet."

Sec. 71 Amend NFPA 1, Section 14.5.2.7 to add the phrase "and all stairway doors shall be unlocked simultaneously without unlatching upon a signal from the fire command center." to items (2) and (3).

Sec. 72 Amend NFPA 1, Section 14.5.2.7.1 to add an item (6), to read:

(6) Entry levels shall provide free access to an approved second exit. These levels shall be designated in "core/shell" building permit drawings with future tenant layouts arranged accordingly.

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Sec. 73 Amend NFPA 1, Table 14.8.1.2 to add on the chart for Business Use "for calculating occupant loads in shell use business use is 65 square feet (6.0 square meters) per person."

Sec. 74 Amend NFPA 1, Section 14.10.1.3.1 to add new subsection 14.10.1.3.1.1:

14.10.1.3.1.1 In non-sprinklered new buildings, parallel paths of travel shall be considered remote if not less than forty (40) feet apart, or separated by assemblies having continuous one hour fire resistance with self-closing and positive latching twenty (20) minute fire [resistance] protection rated opening protectives. In fully sprinklered buildings and existing buildings paths of travel shall be considered remote if not less than thirty (30) feet apart, or separated by assemblies with self-closing opening protectives which are resistant to the passage of smoke. This minimum separation of paths shall not supersede minimum separation of exits or doors in 14.10.1.3.2.

Sec. 75 Amend NFPA 1, Section 14.11.2.3 by adding two sentences at the end of the section as follows:

In new installations, the door to the exterior of the building shall be in direct sight of the point of the termination of the exit. For the purposes of this section, in new installations, the use of exit signs or other exit markings shall not be considered as making the way to the exterior "readily visible and identifiable".

Sec. 76 Amend NFPA 1, Section 14.13.1.2 to replace the word "only" in the first sentence with ", but not be limited to,"

Sec. 77 Amend NFPA 1, Section 14.14.8.3.1 to add: If the sign is on the door, then the door must be equipped with an approved self-closing device.

Sec. 78 Amend NFPA 1, Section 18.1.1.1 and Section 18.1.1.2 to replace the word "fire department" with "AHJ".

Sec. 79 Amend NFPA 1, Section 18.2.2 to add the following subsection:

18.2.2.4 In new installations, not less than one exit stair which serves all stories of the building shall be accessible by an internal corridor from the main entrance of the building or fire department response location.

Sec. 80 Amend NFPA 1, Section 18.2.2.1, add two new subsections as follows:

18.2.2.1.1 All occupancies other than 1 and 2 family dwellings shall be provided with an approved access box.

Exception 1: The requirement for an access box shall not apply when the occupancy provides 24-hour on-site staffing with access to all areas in the building or complex. At least one person must staff a fixed location proximate to the main building or complex entrance to provide ready access for the fire department.

Exception 2: For multiple occupancies located within a single structure, a single access box shall be permitted with approval of the Fire Chief.

Exception 3: For multiple structures within a residential building complex, a single access box shall be permitted with approval of the Fire Chief.

18.2.2.1.2 The size, contents, and location of the access box shall be determined by the Fire Chief in cooperation with the occupancy owner or management.

Sec. 81 Amend NFPA 1, Section 18.2.3 to add the following: The AHJ shall have the authority to require and designate public or private fire lanes and fire department access roads as considered necessary.

Sec. 82 Amend NFPA 1, Section 18.2.3.1.3 to delete "When not more than two one- and two-family dwellings or private garages, carports, sheds, and agricultural buildings, and detached buildings or structures 400 ft^2 (37 m^2) or less are present,".

Sec. 83 Amend NFPA 1, Section 18.2.3.2.1 to replace the phrase "exterior door" with "exterior door acceptable to the AHJ".

Sec. 84 Amend NFPA 1, Section 18.3.1 to add the following sentence:
Regardless of new or existing conditions, Section 18.3.1.1 shall apply.

Sec. 85 Amend NFPA 1, Section 18.3.1 to add the following subsection:

18.3.1.1 For new and existing conditions, the hydrant closest to the property shall be capable of delivering a minimum of 1000 gallons per minute with 20 psi residual pressure. The next closest hydrant shall be capable of flowing a minimum of 500 gallons per minute at the same time.

Sec. 86 Amend NFPA 1, Section 18.3.3 to add the following subsection:

18.3.3.1 For buildings without automatic sprinklers within areas provided with a municipal water supply, the distance from the building to the closest hydrant shall not exceed 400 feet when measured along the path of fire department access.

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Sec. 87 Amend NFPA 1, Section 20.3.4.1.1 to delete the phrase "more than 3, but" and after the "."after "12".

Sec. 88 Amend NFPA 1, Section 20.3.4.2.3.5.1 to add the following exception. Exception: Day-care homes.

Sec. 89 Amend NFPA 1, Section 20.3.4.2.3.5.4 to add the following exception. Exception: Day-care homes with not more than three clients for overnight lodging.

Sec. 90 Amend NFPA 1, Section 20.5.2.3.6 by adding a sentence as follows: "If more than three residents are not able to participate in the drill, the facility shall be considered as a Health Care Occupancy and shall be reevaluated in accordance with NFPA 101, Section 43.7.

Sec. 91 Amend NFPA 1, Section 25.2.2.1 to add the phrase "or other approved testing standard approved by the State Fire Marshal".

Sec. 92 Amend NFPA 1, Section 31.3.6.2.2 to add the following item:

(9) Piles containing leaves and other extraneous or hogged material, such as whole tree chip piles, shall be turned or reclaimed at least every 3 months.

Sec. 93 Amend NFPA 1, Section 31.3.6.3.1 to delete the existing wording and replace with the following:

Piles may not exceed 18 feet in height, 50 feet in width, and 350 feet in length. Piles shall be subdivided by fire lanes having at least 25 feet of clear space at the base of piles.

Sec. 94 Delete NFPA 1, Section 31.3.6.3.2, Section 31.3.6.3.2.1, Section 31.3.6.3.2.2, and Section 31.3.6.3.2.3.

Sec. 95 Amend Section 42.7.5 to add the following subsections:

42.7.5.7 Management/owners officials or employees shall conduct daily site visits to ensure that all equipment is operating properly.

42.7.5.8 Regular equipment inspection and maintenance at the unattended self-service facility shall be conducted.

42.7.5.9 Fuel dispensing equipment shall comply with one of the following:
(1) The amount of fuel being dispensed is limited in quantity by preprogrammed card; or
(2) Dispensing devices shall be programmed or set to limit uninterrupted fuel delivery of not more than 25 gallons and shall require a manual action to resume continued delivery.

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Sec. 96 Amend NFPA 1, Section 42.7.5.5 to add the following:
The following information shall be conspicuously posted in this area:
(1) The exact address of the unattended self-service facility.
(2) The telephone number of the owner or operator of the unattended self-service facility.

Sec. 97 Amend NFPA 1, Section 50.2.1 to add the following subsections:

50.2.1.10 Commercial Outdoor Cooking Operations. These requirements apply to commercial outdoor cooking operations such as those that typically take place under a canopy or tent type structure at fairs, festivals and carnivals. This includes but is not limited to deep frying, sautéing, and grilling operations.

50.2.1.10.1 Tent and Canopy Requirements.

50.2.1.10.1.1 Tents or canopies where cooking equipment not protected in accordance with NFPA 96 is located shall not be occupied by the public and shall be separated from other tents, canopies, structures, or vehicles by a minimum of 10 feet (3050 mm) unless otherwise approved by the AHJ.

50.2.1.10.1.2 All tent and canopy material shall comply with flame resistance requirements of Section 25.2.2.

50.2.1.10.2 LP Gas Fuel Requirements.

50.2.1.10.2.1 LP gas tank size shall be limited to 60 lbs. The total amount of LP gas on site shall not exceed 60 lbs for each appliance that is rated not more than 80,000 btu/hr and 120 lbs for each appliance rated more than 80,000 btu/hr.

50.2.1.10.2.2 Tanks must be maintained in good physical condition and shall have a valid hydrostatic date stamp.

50.2.1.10.2.3 Tanks shall be secured in their upright position with a chain, strap or other approved method that prevents the tank from tipping over.

50.2.1.10.2.4 Tanks shall be located so that they are not accessible to the public. LP gas tanks shall be located at least 5 feet from any cooking or heating equipment or any open flame device.

50.2.1.10.2.5 All LP gas equipment shall be properly maintained and comply with the requirements of NFPA 58.

50.2.1.10.2.6 Regulators. Single-stage regulators shall not supply equipment that is rated

more than 100,000 btu/hr rating. Two-stage regulators shall be used with equipment that is rated more than 100,000 btu/hr.

50.2.1.10.3 General Safety Requirements.

50.2.1.10.3.1 All electrical cords shall be maintained in a safe condition and shall be secured to prevent damage.

50.2.1.10.3.2 Movable cooking equipment shall have wheels removed or shall be placed on blocks or otherwise secured to prevent movement of the appliance during operation.

50.2.1.10.3.3 Portable fire extinguishers shall be provided in accordance with NFPA 1, Section 13.6 and shall be specifically listed for such use.

Sec. 98 Annex O - In-Building Public Safety Radio Enhancement System of NFPA 1 is adopted.

Sec. 99 NFPA 1, Section O.3.2 is modified to read as follows:

"Radio Coverage. Radio coverage shall be provided throughout the building such that a minimum of 95% of the building (including all underground levels, basements, elevators, stairways, etc.) is covered at a minimum of 95% of the time."

Sec. 100 Delete NFPA 1, Sections O.3.2.1 and O.3.2.2 and renumber Section O.3.2.3 as O.3.2.1.

Sec. 101 Amend NFPA 1, Section O.3.5.5 to read as follows:

"At a minimum, a two inch diameter conduit/conduit sleeves shall be provided vertically from the roof level to the lowest level of the structure. This conduit will provide a vertical path for cable to all levels and should pass through the in-building public safety radio enhancement system equipment room. At a minimum, one 20-amp AC circuit and building ground shall be located at the public safety radio enhancement system equipment and any outside antenna locations."

Sec. 102 Modify NFPA 1, Section O.3.6.3 to read as follows:

"Secondary Power Source. The secondary power source shall provide enough capacity to power the in-building public safety radio enhancement system for 12 hours at 100 percent system operation capacity. Where the building is provided with a generator, the generator shall supply secondary power to the in-building public safety radio enhancement system."

Sec. 103 Delete NFPA 1, Section O.3.7.2

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Sec. 104 Modify NFPA 1, Section O.3.9.3 to read as follows:

"Test procedures. The test plan shall ensure testing throughout the building. Test procedures shall be as directed by the design professional and the AHJ. Using the Montgomery County control channel, each floor shall be RF (radio frequency) signal level mapped utilizing a calibrated, portable spectrum analyzer. Each floor shall be divided into equal grids of no larger than 50 feet by 50 feet. Individual testing points shall not be spaced greater than 50 feet apart. Each grid shall meet the required signal strength level, and provide a Delivered Audio Quality (DAQ) of not less than 3.5. (DAQ 3.5 is defined as 'Speech understandable with repetition rarely required. Some noise/distortion.') A maximum of two non adjacent grids will be allowed to fail on the same floor. Failure of any two adjacent grids is considered a failure for the entire floor. Critical rooms, including, but not limited to, such areas as the fire command/control center, fire pump room, emergency generator room, stairwells with a standpipes, and other staging areas as identified by the AHJ shall not fail coverage at all. "

Sec. 105 Modify NFPA 1, O.3.10.1 to read as follows:

"The design and acceptance testing of the in-building public safety radio enhancement system shall be performed under the supervision of a Maryland registered professional engineer a minimum of 5 years of experience in the design, installation, and alignment of bi-directional amplifier systems."

Sec. 106 Modify NFPA 1, O.3.11 to read as follows:

"Maintenance. The building owner shall maintain a service contract for emergency repair of the system. The service contract shall be such that telephone support is available within 2 hours and on-site service can be provided within 24 hours of recognition that the in-building public safety radio enhancement system is not operating correctly. A copy of the contract shall be submitted to the AHJ at the time of acceptance testing. If the building owner drops the service contract, the contractor shall notify the AHJ within 24 hours."

Sec. 107 Amend NFPA 80, as referenced by NFPA 1, sections 8.4.2.1.2, 10.4.1.2, 11.4.1.2, 11.4.3.2.2, and 13.4.2 to add the following: Release of fire doors and shutters shall not be solely by fusible link and shall be accomplished by one or more of the following:

(a) Approved local smoke detection at the doors,
(b) Approved area smoke detection per NFPA 72, or
(c) Full automatic sprinkler protection per NFPA 13 with water flow interlock.

Sec. 108 Amend NFPA 96, as referenced by NFPA 1, section 1.1.1, to add an exception to read:

In places of worship and day care facilities, protection shall be permitted to consist of the following:

(1) Electrical range with not more than four heating elements, each heating element shall be electronically controlled to limit the element temperature to below 670 degrees F.
(2) A shunt trip shall be installed for the electric range. If building is equipped with a fire alarm system, the shunt trip shall be interconnected with the fire alarm system. If the building is not equipped with a fire alarm system, other automatic means/devices, approved by DPS, to cut off power to the unit shall be installed in the kitchen.
(3) Kitchen shall be located not more than one story above the level of exit discharge.
(4) Kitchen shall be located not more than one story below the level of exit discharge.
(5) Kitchen shall be separated from adjoining areas by fire barriers with a fire resistance rating of one hour or greater; OR, the kitchen shall be protected with automatic sprinklers.

Sec. 109 Amend NFPA 92A, Section 5.3.1(2) by adding the following: At a minimum, the design shall achieve the performance objectives in the condition with two doors open simultaneously. If there is a door directly to the outside from the stair, the exterior door shall be one of the two doors used in the design.

Sec. 110 Amend NFPA 92B, Section 5.2.3.1 by adding the following: The design fire shall be not less than 5000 Btu/s (5275 kW) unless approved by the building official and the fire official.

Sec. 111 Amend NFPA 92B, Section 5.2.4 by adding the following: At the steady phase, the design fire shall be not less than 5000 Btu/s (5275 kW) unless approved by the building official and the fire official.

Sec. 112 Amend NFPA 101 Section 2.2 by adding Section 2.2.1 to read as follows: Wherever NFPA 5000 is referenced, other than for extracted text, substitute the building code that is in effect in Montgomery County.

Sec. 113 NFPA 101, section 3.3 is amended as follows:

(a) Subsection 3.3.57, add the following new subsection and definition:

3.3.57.3 Bulkhead Door. A type of door assembly covering an opening in the ground providing direct access to a basement, the floor of which is not more than 8 feet below ground level. The door consists of a single rigid leaf or two overlapping rigid leaves or covers which need to be pushed or lifted upwards in order to be opened. A person, after opening the door, can walk up a series of steps to escape to the outside.

(b) Amend Subsection 3.3.131.1 to change the definition of "Day-Care Home" by deleting the

phrase "...more than three, but..."

(c) Amend Subsection 3.3.178.4 to change the definition of "Day Care Occupancy" by deleting the phrase "...four or more ..."

(d) Amend Subsections 3.3.178.12 to change the definition of "Residential Board and Care Occupancy to replace the word "four" with "six".

Sec. 114 Amend NFPA 101, Section 4.5.8 and Section 4.6.13.1 to delete the phrase "for compliance with the provisions of this Code".

Sec. 115 Amend NFPA 101, Section 4.6.13.3 to delete the phrase "by the Code".

Sec. 116 Amend NFPA 101, section 4.8, add the following subsection:

4.8.2.4 Emergency plans shall be maintained in a location approved by the authority having jurisdiction.

Sec. 117 Amend NFPA 101, subsection 6.1.4.1 by deleting the phrase "...four or more ..."

Sec. 118 Amend NFPA 101, subsection 6.1.9.1 to change the definition of "Residential Board and Care Occupancy" to replace the word "four" with "six".

Sec. 119 Amend NFPA 101, subsection 7.2.1.5.7, add the phrase "and all stairway doors shall be unlocked simultaneously without unlatching upon a signal from the fire command center." to items (2) and (3).

Sec. 120 Amend NFPA 101, subsection 7.2.1.5.7.1, add an item (6), to read:

(6) Entry levels shall provide free access to an approved second exit. These levels shall be designated in "core/shell" building permit drawings with future tenant layouts arranged accordingly.

Sec. 121 Amend NFPA 101, Section 7.2.1.6.3 to replace the phrase "in Chapters 11 through 43" with the phrase "by the AHJ and Chapters 11 through 43".

Sec. 122 Amend NFPA 101, Section 7.2.2.1 to add the following subsection: 7.2.2.1.3 In new installations, not less than one exit stair which serves all stories of the building shall be accessible by an internal corridor from the main entrance of the building or fire department response location.

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Sec. 123 Amend NFPA 101, section 7.2.2.4.5.2(1), by replacing the word "Existing" with "Interior".

Sec. 124 Delete NFPA 101, subsections 7.2.3.9.2(3)(b) and 12.2.2.2.4.

Sec. 125 Amend NFPA 101, subsection 7.3.1.2 by adding on the chart for Business Use "for calculating occupant loads in shell use business use is 65 square feet (6.0 square meters) per person."

Sec. 126 Amend NFPA 101, subsection 7.5.1.3.1 by adding new subsection 7.5.1.3.1.1:

7.5.1.3.1.1 In non-sprinklered new buildings, parallel paths of travel shall be considered remote if not less than forty (40) feet apart, or separated by assemblies having continuous one hour fire resistance with self-closing and positive latching twenty (20) minute fire protection rated opening protectives. In fully sprinklered buildings and existing buildings paths of travel shall be considered remote if not less than thirty (30) feet apart, or separated by assemblies with self-closing opening protectives which are resistant to the passage of smoke. This minimum separation of paths shall not supersede minimum separation of exits or doors in 7.5.1.3.2.

Sec. 127 NFPA 101, subsection 7.7.2.3 is amended by adding two sentences at the end of the section as follows:

In new installations, the door to the exterior of the building shall be in direct sight of the point of the termination of the exit. For the purposes of this section, in new installations, the use of exit signs or other exit markings shall not be considered as making the way to the exterior "readily visible and identifiable".

Sec. 128 NFPA 101, Subsection 7.9.1.2, replace the word "only" in the first sentence with "but not limited to,".

Sec. 129 Amend NFPA 101, subsection 7.10.8.3.1 by adding: If the sign is on the door, then the door must be equipped with an approved self-closing device.

Sec. 130 Amend NFPA 101, subsection 8.6.6(3) by adding a second sentence:

Areas shall be considered to satisfy the requirements of 'readily obvious' when the communicating space is provided with automatic smoke detection and alarm in accordance with NFPA 72.

Sec. 131 NFPA 101, subsection 8.6.7(6)(b) at the end of the sentence add the phrase "in a location approved by the AHJ".

Sec. 132 Amend NFPA 101 by adding new section 9.1.5 as follows:

9.1.5 In-Building Public Safety Radio Enhancement System

9.1.5.1 All newly constructed below ground floors of a building, all floors in buildings greater than 25,000 ft² per floor, and all floors of buildings greater than 3 stories in height shall meet minimum emergency radio communication system performance criteria adopted by Montgomery County. Proof that minimum performance criteria are met shall be provided in writing to the Fire Chief.

(1) System performance testing shall be performed in accordance with technical standards for systems and testing personnel established by Montgomery County.

(2) Compliance testing shall be performed at time of occupancy.

(3) Field testing may be performed upon reasonable notification of the owner or occupant by any authorized fire and rescue personnel.

Exception: One and two family dwellings and town homes.

9.1.5.2 In existing buildings, where emergency radio communication system performance is reported to be inadequate, the Fire Marshal shall be permitted to require a technical analysis to determine the level of performance of the emergency radio communication system. Where the analysis demonstrates unacceptable performance, an in-building public safety radio enhancement system shall be provided.

9.1.5.3 Where installed to achieve the minimum emergency radio communication system performance criteria, an in-building public safety radio enhancement system shall be designed in accordance with Annex O of NFPA 1, as amended.

9.1.5.4 All testing, design, installation, inspection, and maintenance required by Section 9.1.5 shall be performed by personnel approved by the Fire Marshal.

Sec. 133 Amend NFPA 101, subsections 9.6.1.6 and 9.7.6.1 by add: When a property owner or the owner's agent cannot be contacted to establish a fire watch, the Montgomery County Fire and Rescue Service at their discretion may provide the fire watch and charge the property owner the inspection overtime rate per person per hour.

Sec. 134 NFPA 101, subsection 9.6.2.6 is amended as follows:

(a) Add the following sentence to the end of the section: "This paragraph does not permit the omission of manual fire alarm boxes in accordance with other provisions of this subsection unless specifically permitted by Chapters 11 through 43."

(b) Add two new subsections as follows:

9.6.2.6.1 Zoned fire alarm systems shall have manual pull stations located at the entrance to each exit enclosure and at the main exit.

9.6.2.6.2 When a fire alarm system is required in a multiple tenant building, for each tenant exiting directly to the exterior of the building, a manual pull station and approved occupant notification shall be located at each required or marked exit.

Sec. 135 Amend NFPA 101, Section 9.6.2.9 to add the following sentence: "In environments not suitable for smoke detectors, alternate means of detection shall be provided and shall comply with NFPA 72 Section 4.4.4.1."

Sec. 136 NFPA 101, add new subsection 9.6.2.11 to read: "Where required by another section of this code, carbon monoxide alarms or carbon monoxide detectors shall be installed in accordance with NFPA 720."

Sec. 137 Amend NFPA 101, Section 9.6.3.2.1 to delete the phrase "lobby,".

Sec. 138 Amend NFPA 101, Section 9.6.3.4, to adding the following at the end of the sentence: "only when the initial fire alarm signal is automatically transmitted without delay to a listed central station in accordance with 9.6.4."

Sec. 139 NFPA 101, Section 9.6.3.7, add a second sentence to read: "Required audibility shall be met with all intervening doors (between any space and the audible devices) closed."

Sec. 140 Amend NFPA 101, Section 9.6.3.9 by adding: Where voice type occupant notification is used, automatic pre-recorded messages shall be used complying with Section 9.6. Live voice as the sole notification method is prohibited.

Exception: Previously "approved" live voice systems, shall be permitted to remain.

Sec. 141 Amend NFPA 101, Section 9.6.4.2 by deleteing the list of four items and replace the phrase "any of the following means acceptable to the authority having jurisdiction" with "by a listed central station fire alarm system".

Sec. 142 NFPA 101, delete subsection 9.6.4.3.

Sec. 143 NFPA 101, subsection 9.6.5.2(3), add the following sentence: "Manual fire alarm initiation shall not activate floor or zone-dependent smoke control systems."

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Sec. 144 NFPA 101, delete subsection 9.6.7.4.3

Sec. 145 Amend NFPA 101, Section 9.7.1.1 to add the following subsection: 9.7.1.1.1 For new installations, drop-out ceilings as referenced in NFPA 13, Subsections 8.15.14 shall be prohibited.

Sec. 146 NFPA 101, subsection 9.7.2.2, the first sentence is amended to read: "Where supervised automatic sprinkler protection is required by another section of this Code, waterflow alarms shall be automatically transmitted to a listed central station."

Sec. 147 NFPA 101, subsection 9.7.3.1 is amended to read: "Where water as an extinguishing agent is not compatible with the fire hazard or is prohibited by law, statute or ordinance, the affected area shall be equipped with an approved automatic fire suppression system utilizing a suppression agent that is compatible with the fire hazard. Such system shall be installed in accordance with the appropriate standard as determined in Table 9.7.3.1."

Sec. 148 NFPA 101, Section 9.7.5 delete the phrase "required by this Code".

Sec. 149 Amend NFPA 101, Section 11.8.3.1 by adding the phrase "except for existing high-rise apartment occupancy buildings" at the end of the first sentence.

Sec. 150 NFPA 101, subsection 11.8.4.1, add new subsection 11.8.4.1.1:

11.8.4.1.1 In buildings having staged evacuation the voice fire alarm system shall send a predetermined message to the floor where the alarm originated, to the floor immediately below and to the floor immediately above, providing information and direction to the occupants. Any subsequent alarm(s) on other than the initial fire floor must initiate the voice fire alarm as described above. The voice fire alarm shall be designed to be heard clearly by all occupants within the designated portions thereof as required by Section 9.6, but it shall not sound automatically in elevator cars and enclosed exit stairways. Communicating levels shall be considered one floor/fire area for the audible and visual fire alarm signals.

Sec. 151 Amend NFPA 101, section 11.8.6.1, add a new subsection 11.8.6.1.1 to read:
"In new installations, the emergency command center shall have a door directly to the exterior of the building on the address side. The exterior door to the emergency command center shall be within 50 feet of a fire department access road. A fire department access box shall be provided within 6 feet of the door to the emergency command center. The exterior door to the emergency command center shall be identified on the exterior face as the emergency command center in a manner acceptable to the Fire Chief."

Sec. 152 NFPA 101, subsections 11.8.6.2 (8) and (10), are amended to read as follows:

(8) Emergency generator status indicators, and remote starting.

(10) Fire pump status indicators and remote starting.

Sec. 153 NFPA 101, subsection 11.8.6, add a new subsection 11.8.6.3 to read: "The emergency command center shall also comply with the provisions of Section 911 of the International Building Code, 2009 edition.

Sec. 154 Amend NFPA 101, Section 11.11.2.1 to add the phrase "or other approved testing standard approved by the State Fire Marshal".

Sec. 155 Amend NFPA 101, Section 12.2.4.1 is amended by completely replacing the text with the following:

12.2.4.1 Exits shall comply with the following, except as otherwise permitted by 12.2.4.4:
(1) The number of means of egress shall be in accordance with Section 7.4.
(2) Not less than two separate exits shall be provided on every story.
(3) Not less than two separate exits shall be accessible from every part of every story.

Sec. 156 NFPA 101, subsection 14.2.11.1.1(1) is amended by adding the following after "...tools", "keys, special knowledge, or excessive force."

Sec. 157 Amend NFPA 101, sections 16.1.1 and 17.1.1, to add subsections 16.1.1.6 and 17.1.1.6 as follows: Day-care centers providing day care for school age children before and after school hours in a building which is in use as a public or private school are not required to meet the provisions of this chapter, but shall meet the provisions for educational occupancies.

Sec. 158 NFPA 101, subsections 16.2.11.1.1 and 17.2.11.1.1 to add the following item:

(4) For windows at grade the minimum net clear opening shall be permitted to be 5.0 square feet.

Sec. 159 Amend NFPA 101, subsection 16.2.11.1.2, to add the following item to the list:

(3) Group Day-Care Homes and Family Day-Care Homes which are protected by hard-wired, interconnected smoke alarms or detectors in each room or space of the building (including corridors). Such smoke alarms or detectors are not necessary in bathrooms, closets, attached garages, or attic spaces without storage. In addition, if the building's furnace, hot water heater, and/or clothes dryer is fueled by natural gas or propane gas, then these areas shall be protected by sprinklers supplied by the domestic system.

Sec. 160 Amend NFPA 101, subsections 16.3.4.5 and 17.3.4.5 to add the following exception:

Exception: Day-care occupancies located in school facilities where enrollment is limited to children capable of self preservation, where no sleeping facilities are provided and the school is provided with approved full automatic sprinkler protection.

Sec. 161 NFPA 101, add new subsection 16.3.5.4 to read: Buildings containing new day care centers above or below the level of exit discharge shall be protected throughout with full automatic sprinkler protection installed in accordance with section 9.7.

Sec. 162 NFPA 101, subsections 16.6.1.1.2, and 17.6.1.1.2, delete the phrase "...more than 3, but.."

Sec. 163 NFPA 101, subsections 16.6.1.4.1.1, 16.6.1.4.1.2, 17.6.1.4.1.1 and 17.6.1.4.1.2 are amended as follows:

(a) Subsections 16.6.1.4.1.1 and 17.6.1.4.1.1, delete the phrase "more than three but" and replace the phrase "seven clients" with "nine clients".

(b) Subsections 16.6.1.4.1.2 and 17.6.1.4.1.2, change the phrase "at least seven" to "at least nine."

Sec. 164 NFPA 101, subsections 16.6.1.7.1 and 17.6.1.7.1, replace items (1) and (2) with the following items:

(1) The minimum staff-to-client ratio shall be not less than one staff for up to eight clients, including the caretaker's own children incapable of self-preservation.

(2) There shall be not more than four clients incapable of self-preservation, including the caretaker's own children incapable of self-preservation.

(3) A staff-to-client ratio of at least one staff to every two clients incapable of self-preservation shall be maintained at all times.

(4) The staff-to-client ratio shall be permitted to be modified by the authority having jurisdiction where safeguards in addition to those specified in this section are provided.

Sec. 165 NFPA 101, subsection 16.6.2.1 and 17.6.2.1, add the following sentence: "Bulkhead doors shall not be permitted to serve as a primary means of escape."

Sec. 166 NFPA 101, subsections 16.6.2.2 (Reserved) and 17.6.2.2 (Reserved) are amended as follows:

SLIDING DOOR.

For family day-care homes, a sliding door used as a required means of egress shall comply with the following conditions:

(1) The sliding door shall have not more than one, easily operated, locking device that does not require special knowledge, effort, or tools to operate;
(2) There may not be draperies, screens, or storm doors that could impede egress;
(3) The sill or track height may not exceed 1/2 inch above the interior finish floor;
(4) The surface onto which exit is made shall be an all weather surface such as a deck, patio, sidewalk, etc;
(5) The floor level outside the door may be one step lower than the inside, but not more than 8 inches lower;
(6) The sliding door shall open to a clear open width of at least 28 inches;
(7) Before day care use, each day the sliding door shall be unlocked and tested to the full required width to be sure it is operating properly, and the door shall be nonbinding and slide easily;
(8) During periods of snow or freezing rain, door tracks shall be cleared out and the door opened periodically throughout the day in order to ensure proper operation.

Sec. 167 NFPA 101, subsections 16.6.2.3 (Reserved) and 17.6.2.3 (Reserved) are amended as follows:

SPECIAL MEANS OF ESCAPE REQUIREMENTS: For family day-care homes, dead-bolt locks shall be provided with approved interior latches, or these locks shall be of a captured key design from which the key cannot be removed from the interior side of the lock when the lock is in the locked position. These locks shall be unlocked at all times when the home is occupied for the purpose of family day care. Exception: A double-keyed dead-bolt lock may be used on the secondary means of escape if the key is readily accessible and the lock is unlocked at all times the home is occupied for the purpose of family day care.

Sec. 168 NFPA 101, subsection 16.6.3.4 add the following subsection:

16.6.3.4.4 Approved battery-powered smoke alarms rather than house electrical service-powered smoke alarms required by 16.6.3.4.3 shall be permitted where the facility has testing, maintenance and battery replacement programs that ensure reliability of power to the smoke alarms.

Sec. 169 NFPA 101, subsections 16.7.4.1 and 17.7.4.1 add an Exception:

Exception: Day-Care Homes.

Sec. 170 NFPA 101, subsections 16.7.5 and 17.7.5, add an Exception:

Exception: Day-Care Homes with no more than three clients for overnight lodging.

Sec. 171 NFPA 101, subsection 17.2.11.1.2 add the following item to the list:

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(3) Group Day-Care Homes and Family Day-Care Homes which are:
(a) Protected by hard-wired, interconnected smoke alarms or detectors in each room or space of the building (including corridors). Such smoke alarms or detectors are not necessary in bathrooms, closets, attached garages, or attic spaces without storage; and,
(b) When the building's furnace, hot water heater, and/or clothes dryer is fueled by natural gas or propane gas, these areas are protected by sprinklers supplied by the domestic system.

Sec. 172 Amend NFPA 101 as follows:
(a) Subsection 17.6.3.4.4, delete "Existing..."
(b) Section 22.4.5.1.3 to delete the phrase "or 22.4.5.1.5".
(c) Sections 22.4.5.1.4(1) and 23.4.5.1.4(1) to replace the phrase "2 minutes" with "30 seconds".
(d) Sections 22.4.5.1.4(2) and 23.4.5.1.4(2) to replace the phrase "2 minute" with "30 seconds".
(e) Delete NFPA 101, Sections 22.4.5.1.5 and 23.4.5.1.5.
(f) Delete NFPA 101, Sections 22.4.5.2 and 23.4.5.2.
(g) Section 23.4.5.1.3 to delete the phrase "or 23.4.5.1.5".

Sec. 173 Amend NFPA 101, subsection 24.1.1.1 to replace the word "three" with "five" and to delete the phrase ",if any, accommodated in rented rooms".

Sec. 174 Amend NFPA 101, subsections 24.2.2.3.3, 32.2.2.3.1(3), and 33.2.2.3.1(3) to insert the phrase ", not less than 5.0 ft^2 when at grade" after the phrase "5.7 ft^2".

Sec. 175 NFPA 101, subsection 24.3.4.3, add at the end of the sentence, "...only if the existing smoke alarms are battery operated."

Sec. 176 NFPA 101, add new subsection 24.3.4.4 to read: Carbon monoxide alarms or detectors shall be installed in any dwelling unit containing a fuel burning appliance, fireplace, or having an attached garage.

Sec. 177 NFPA 101, subsection 26.1.1.1, change "buildings" to "buildings that do not qualify as one- and two-family dwellings".

Sec. 178 NFPA 101, add new subsections 26.3.4.7, 28.3.4.7, 30.3.4.7, 32.2.3.4.5, and 32.3.3.4.10 to read: "Carbon monoxide alarms or detectors shall be installed as follows:

(a) In any dwelling unit or sleeping unit, where the unit is served by or contains a fuel burning appliance or fireplace; and
(b) In common areas, where the common areas are served by a fuel burning appliance or fire

place."

Sec. 179 NFPA 101, subsection 28.3.4.1 is amended by changing "28.3.4.6" to "28.3.4.7".

Sec. 180 NFPA 101, subsection 28.3.4.3.5, in only the first sentence, delete all wording after "provided".

Sec. 181 NFPA 101, delete subsections 29.3.4.5.2 and 31.3.4.5.2.

Sec. 182 Amend NFPA 101, Section 30.2.4.1, after the word "exits" insert the phrase "which are provided on every story and which are"

Sec. 183 Amend NFPA 101, Section 30.3.4.3.2 to delete phrase "unless the building complies with either 30.3.4.3.3 or 30.3.4.3.4".

Sec. 184 NFPA 101, delete subsections 30.3.4.3.3 and 30.3.4.3.4.

Sec. 185 Delete NFPA 101, Section 31.3.5.12

Sec. 186 NFPA 101, Sections 32.7.3.6 and 33.7.3.6 add a sentence as follows: "If more than three residents are not able to participate in the drill, the facility shall be considered as a Health Care Occupancy and shall be reevaluated in accordance with Section 43.7.

Sec. 187 NFPA 101, subsections 33.2.3.4.3.5 and 33.3.3.4.7.1, add at the end of the sentence, "...and have secondary battery back-up power."

Sec. 188 NFPA 101, subsection 36.3.4.1 and 37.3.4.1 are amended to read as follows: General. Class A mercantile occupancies and multiple story Class B mercantile occupancies shall be provided with a fire alarm system in accordance with section 9.6.

Sec. 189 NFPA 101, subsection 36.4.4.4.3.2, to add "where approved alternative visible means of occupant notification is provided".

Sec. 190 Delete NFPA 101, Sections 36.4.4.8(1)(b) and 37.4.4.8(1)(b).

Sec. 191 NFPA 101, subsections 38.2.4.7 and 39.2.4.7, are added as new sections to read as follows:

Any two story business occupancy building not exceeding 3000 square feet gross floor area per floor shall be permitted a single exit with an approved outside stairway, or a single totally enclosed interior stairway to the second floor having discharge directly outside the building, if the total travel distance to the outside of the building does not exceed 100 feet, the travel distance to the interior stairway does not exceed 75 feet, and such interior stairway does not communicate with any other floor. An interior single exit stairway shall be permitted to be

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arranged as a floor communicating stair, with one (1) hour fire resistance rated opening protectives at the entrances from each level, and protection provided as follows: The building shall be provided with a non-supervised AC hard-wired smoke detection and alarm system in accordance with NFPA 72, arranged to sound an alarm audible throughout each level, and the stairway shall be provided with approved automatic sprinkler protection, with sprinklers located at the top of the stair and over each landing and on the tenant side of each interior fire door leading to the stairway, in accordance with NFPA 13.

Sec. 192 Amend NFPA 101, Section 38.3.2.1 by adding Section 38.3.2.1.1 to read as follows:

38.3.2.1.1 General storage areas with a floor area not greater than 100 square feet shall be exempt from the provisions of 8.7.

Sec. 193 NFPA 101, subsection 39.2.2.2.4 is amended to read: "The re-entry provisions of 7.2.1.5.7 shall apply."

Sec. 194 Amend NFPA 101, Section 39.3.2.1 by adding Section 39.3.2.1.1 to read as follows:

39.3.2.1.1 General storage areas with a floor area not greater than 100 square feet shall be exempt from the provisions of 8.7.

Sec. 195 NFPA 101, subsection 39.3.4.3(2) is amended to read: "Sound an audible alarm in a constantly attended location and transmit a signal to a listed Central Station."

Sec. 196 NFPA 101, subsections 40.3.4.3.1, 42.3.4.3.1 and 42.8.3.4.3.1 are amended to read: "The required fire alarm system shall provide occupant notification in accordance with 9.6.3."

Sec. 197 Amend NFPA 101, Sections 42.3.4.1.2 and 42.3.4.1.3 to replace the phrase "Storage occupancies" with "Storage occupancies less than three stories".

Approved.

Isiah Leggett,
County Executive

Approved as to form and legality
Montgomery County, Md. County Attorney's Office
By: Malcolm F. Spruill