2009 IRC

Amendments

September 15, 2010

PLANNING, DEVELOPMENT AND TRANSPORTATION
P.O. BOX 580 281 N COLLEGE AVE FORT COLLINS, CO 80524
970.416.2740 970.224.6134 FAX *fcgov.com/nbs/codes.php*

ORDINANCE NO. 100, 2010
OF THE COUNCIL OF THE CITY OF FORT COLLINS
AMENDING CHAPTER 5, ARTICLE II, DIVISION 2, OF THE CODE
OF THE CITY OF FORT COLLINS FOR THE PURPOSE OF
REPEALING THE *2003 INTERNATIONAL*
RESIDENTIAL CODE (IRC), AND ADOPTING THE
2009 INTERNATIONAL RESIDENTIAL CODE, WITH AMENDMENTS

WHEREAS, since 1924, the City has reviewed, amended and adopted the latest nationally recognized building standards available for the times; and

WHEREAS, upon recommendation of City staff, the City Council has determined that it is in the best interests of the City to align the five interconnected basic construction codes under one publication year; and

WHEREAS, the five interconnected basic construction codes are the *International Building Code, International Residential Code, International Mechanical Code, International Fuel Gas Code,* and *International Energy Conservation Code*; and

WHEREAS, the City Council has determined that the 2009 publication year of the five interconnected basic construction codes ought to be adopted and that their counterpart codes previously adopted should be repealed both in order to align the publication years of the codes and also because the 2009 publications contain improvements in construction code regulation; and

WHEREAS, City staff has conducted a significant public outreach program, working with the regulated construction industry and building professionals; and

WHEREAS, the adoption of the five interconnected basic construction codes has been presented to and recommended by the Affordable Housing Board, the Commission on Disability, the Air Quality Advisory Board, the Natural Resources Advisory Board, the Building Review Board, the Electric Board, the Landmark Preservation Commission and the Water Board; and

WHEREAS, the Council of the City of Fort Collins has determined that it is in the best interest of the health, safety and welfare of the City and its citizens that the *2003 International Residential* Code be repealed and that in its place, the *2009 International Residential Code*, be adopted, with amendments.

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF FORT COLLINS as follows:

Section 1. That Section 5-26(d) of the Code of the City of Fort Collins is hereby amended to read as follows:

(d) Pursuant to the power and authority conferred on the City Council by Section 31-16-202, C.R.S., and Article II, Section 7 of the Charter, the City Council hereby repeals

the 2003 Edition of the *International Residential Code*, and adopts as the residential building code of the City the *2009 International Residential Code* published by the International Code Council, as amended by the City, which shall have the same force and effect as though set forth in full herein. The subject matter of the *International Residential Code* adopted herein includes comprehensive provisions and standards for the protection of the public health and safety by prescribing regulations governing the construction, alteration, enlargement, relocation, replacement, repair, equipment, use and occupancy, location, removal and demolition of, and its applicability is hereby limited to, individual nonattached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three (3) stories above grade in height with a separate means of egress, and their accessory structures.

Section 2. That Section 5-30 of the Code of the City of Fort Collins is hereby repealed and reenacted to read as follows:

Sec. 5-30 Amendments and deletions to code.

The *2009 International Residential Code* adopted herein is hereby amended in the following respects:

(1) ***Section R101.1 Title*** is hereby amended to read as follows:

"**R101.1 Title.** These provisions shall be known as the Residential Code for One- and Two-family Dwellings of the City of Fort Collins and shall be cited as such and will be referred to herein as "this code."

(2) ***Section R102.4 Referenced codes and standards,*** is hereby amended to read as follows:

"**R102.4 Referenced codes and standards.** The codes and standards referenced herein shall be those that are listed in Section 101.4, entitled 'Referenced Codes' of the adopted *International Building Code* and shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply."

(3) ***Section R103 Code Administration*** is hereby amended to read as follows:

"**SECTION R103 CODE ADMINISTRATION.**

R103.1 Entity charged with code administration shall be as determined in accordance with Section 103, entitled 'Code Administration' of the adopted *International Building Code.*"

(4) ***Section R105.2 Work exempt from permit,*** items 1, 3, 5, 7, 8, 9, 11, 12, 13, 14 under the heading of "Building" are amended to read as follows:

"**R105.2 Work exempt from permit.** Permits shall not be required for the following buildings, structures, or alterations thereto listed below. Exemption from the permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of the City.

Building:

1. Detached one-story accessory buildings used for lawn and garden equipment storage, tool storage and similar uses, provided such buildings do not exceed 120 square feet (11.15 m^2) of floor area nor 8 feet (2.438 m) in height, do not house flammable liquids in quantities exceeding 10 gallons (38 l) per building and are constructed entirely of noncombustible materials when located less than 3 feet (0.914 m) from an adjoining property line.

3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the low side grade to the top of the wall, provided the horizontal distance to the next uphill retaining wall is at least equal to the total height of the lower retaining wall, unless supporting a surcharge or impounding Class I, II or IIIA liquids.

5. Platforms and decks intended for human occupancy or walking, sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any basement window or story below and are not part of an accessible route.

7. Prefabricated and portable swimming or wading pools, hot tubs or spas when the walls are entirely above grade and which cannot contain water more than 24 inches (610 mm) deep.

8. Swings and other play or playground equipment, including elevated playhouses not exceeding 120 square feet (11.15 m^2) of floor area nor 8 feet (2.438 m) in height measured from the floor to the highest point of such structure, designed and used exclusively for play.

9. Window awnings on Group R, Division 3 and Group U Occupancies projecting not more than 54 inches (1372 mm), window replacement requiring no structural alteration and when such work is determined not to be historically significant, storm window, storm door and rain gutter installation.

11. Roofing repair or replacement work not exceeding one square (100 square feet) of covering per building.

12. Replacement of nonstructural siding.

13. Minor work valued at less than $500 when such minor work does not involve alteration of structural components, fire-rated assemblies, plumbing, electrical, mechanical or fire-extinguishing systems.

14. Decorative ponds, fountains and pools which cannot contain water more than 24 inches (610 mm) deep."

(5) ***Section R105.2 Work exempt from permit,*** is further amended by deleting all headings and references under Electrical, Gas, and Mechanical.

(6) ***Section R105.5 Expiration*** is hereby amended by adding a second paragraph to read as follows:

"Both prior to and subsequent to the effective date of this code, any work authorized by a permit regulated by this code or any other building construction code administered by the building official that involves the construction or alteration of an exterior building component, assembly or finish material, such as the foundation, wall and roof framing, sheathing, siding, fenestration, and roof covering, shall be fully finished and completed for permanent outdoor exposure within 24 months of date of this issuance of such permit, regardless of when then permit was issued. Failure to comply with the preceding specified time period shall constitute a violation of this code, resulting in revocation of the permit, and shall subject the permit holder and property owner to all penalties provided by the Code of the City. "

(7) ***Section R105.10 Premises Identification*** is hereby added to read as follows:

"**R105.10 Premises Identification**. The approved permit number and street address number shall be displayed and be plainly visible and legible from the public street or road fronting the property on which any new building is being constructed."

(8) ***Section R105.11 Transfer of permits,*** is hereby added to read as follows:

"**R105.11 Transfer of permits**. A current valid building permit may be transferred from one party to another upon written application to the building official. When any changes are made to the original plans and specifications that substantially differ from the plans submitted with the permit, as determined by the building official, a new plan review fee shall be paid as calculated in accordance with Section R108. A fee of $50 shall be paid to cover administrative costs for all building permit transfers. No change shall be made in the expiration date of the original permit."

(9) ***Section R106.1.3 Information for construction in areas prone to flooding*** is hereby amended to read as follows:

"**R106.1.3 Information for construction in areas prone to flooding.** "For buildings or structures regulated under the scope of this code that are in whole or in part located in flood hazard areas, construction documents shall be submitted as established in accordance with the Code of the City, Chapter 10, entitled 'Flood Prevention and Protection'."

(10) ***Section R106.1.4 Grading performance plans and certificate***, is hereby added to read as follows:

"**R106.1.4 Grading performance plans and certificate**. Every building permit application for a new building regulated by this code shall be accompanied by a site drainage/grading performance plan as prescribed by City standards."

(11) ***Section R106.1.5 Exterior wall envelope***, is hereby added to read as follows:

"**R106.1.5 Exterior wall envelope**. Construction documents for all buildings shall describe the exterior wall envelope in sufficient detail to determine compliance with this code. When applicable as determined by the building official, construction documents submitted as part of the building permit application shall provide details of the exterior wall envelope as required, including flashing, intersections of dissimilar materials, corners, end details, control joints, intersections at roof, eaves, or parapets, means of drainage, water-resistive membrane, and details around openings. The construction documents shall include manufacturing installation instructions that provide supporting documentation that the proposed penetration and opening details described in the construction documents maintain the weather resistance of the exterior wall envelope. The supporting documentation shall fully describe the exterior wall system which was tested, where applicable, as well as the test procedure used."

(12) ***Section R106.3.1 Approval of construction documents***, is hereby amended to read as follows:

"**R106.3.1 Approval of construction documents.** When the building official issues a permit, the construction documents shall be approved in writing or by a stamp. One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or his or her authorized representative."

(13) ***Section R107, TEMPORARY STRUCTURES AND USES***, is deleted in its entirety.

(14) ***Section R108, FEES***, is hereby amended in its entirety to read as follows:

"**SECTION 108 FEES**

R108.1 Payment of fees. All items relating to fees shall be as specified and in accordance with Section 109 Fees of the adopted *International Building Code*."

(15) ***Section R109.1.7 Site Survey required,*** is hereby added to read as follows:

"**R109.1.7 Site Survey required.** A survey or improvement location certificate of the site on which a new building or addition is to be constructed may be required by the building official to verify that the structure is located in accordance with the approved plans and any other regulations of the City."

(16) ***Section R110.2 Change in use,*** is hereby amended to read as follows:

"**R110.2 Change in use.** Changes in the character or use of an existing structure shall not be made except in conformance with this code and the general building code enacted by the City."

(17) ***Section R112, BOARD OF APPEALS***, is hereby amended in its entirety to read as follows:

"**SECTION R112 BOARD OF APPEALS**

R112.1 General. Appeals of decisions, determinations and interpretations of this code shall be made pursuant to applicable provisions as set forth in Section 113, entitled 'Board of Appeals' of the adopted *International Building Code.*"

(18) ***Section R113.4 Violation penalties,*** is hereby amended to read as follows:

"**R113.4 Violation penalties.** Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this code, shall be guilty of a misdemeanor subject to the penalties and fines pursuant to Section 1-15 of the Code of the City, punishable by a fine of not more than $1,000 or by imprisonment not exceeding 180 days, or both such fine and imprisonment. Each day that a violation continues after due notice has been served shall be deemed a separate offense."

(19) ***Section R113.5 Work commencing before permit issuance*** is hereby added to read as follows:

"**R113.5 Work commencing before permit issuance.** In addition to penalties set forth in R113.4, any person or firm who, before obtaining the necessary permit(s), commences any construction of, or work on, a building, structure, electrical, gas, mechanical or plumbing system that is not otherwise exempted from obtaining a permit, shall be subject to a processing and penalty fee in addition to the standard prescribed permit fee. Such additional fee shall be equal to the permit fee, except that such fee shall not be less than $50 nor more than $1,000 for the first such violation. A person or firm committing such violation repeatedly is subject to processing and penalty fees equal to double the amount of the permit fee or double the amount of the preceding violation, whichever is greater, for every same such subsequent violation committed thereafter within any 180-day period. The foregoing fees may be appealed to the City Manager pursuant to Chapter 2, Article VI of the Code of the City."

(20) ***Section R202, DEFINITIONS***, terms are hereby amended or added in alphabetical sequence in the following respects:

The term, "*BASEMENT*", is hereby amended to read as follows:

"**BASEMENT.** That portion of a building located partly or completely below grade, wherein the underside of the floor system immediately above is 72 inches (1829 mm) or more above the surface of an approved permanent basement floor system."

The term, "*CITY*" is hereby added to read as follows:

"**CITY** is defined as set forth in the Code of the City."

The term, "*CRAWLSPACE*" is hereby added to read as follows:

"**CRAWLSPACE.** That portion of a building that is conditioned or non-conditioned space located partly or completely below grade (excluding the under-floor space beneath below-grade structural floor systems), wherein the underside of the adjacent finished floor above is less than 72 inches (1829 mm) above the bottom surface of such crawlspace."

The term, "*DWELLING*" is hereby amended to read as follows:

"**DWELLING** is defined as set forth in the Land Use Code."

The term, "*DWELLING UNIT*" is hereby amended to read as follows:

"**DWELLING UNIT** is defined as set forth in the Land Use Code."

The term, "*FAMILY*" is hereby added to read as follows:

"**FAMILY** is defined as set forth in the Land Use Code."

The term, "*FLOOR AREA*" is hereby added to read as follows:

"**FLOOR AREA.** The area included within the surrounding exterior walls of a building or portion thereof, exclusive of vent shafts and courts. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above."

The term, "*GRADE*" is hereby amended to read as follows:

"**GRADE** (ADJACENT GROUND ELEVATION). The lowest point of elevation of the finished surface of the ground, paving or sidewalk with the area between the building and the property line or, when the property line is more than 5 feet (1.524 m) from the building, between the building and a line 5 feet (1.524 m) from the building."

The term "*HABITABLE SPACE*", is hereby amended to read as follows:

"**HABITABLE SPACE.** A space in a building approved for living, sleeping, eating or cooking, bathing and personal hygiene. Closets, halls, crawlspaces, storage, laundry rooms, utility spaces and similar areas are not considered habitable spaces."

The term *"ROOM, SLEEPING (BEDROOM")*, is hereby added to read as follows:

"**ROOM, SLEEPING (BEDROOM).** A habitable room within a dwelling or other housing unit designed primarily for the purpose of sleeping. The presence of a bed, cot, mattress, convertible sofa or other similar furnishing used for sleeping purposes is indicia for determining that such space or room qualifies as a sleeping room. The presence of closets and similar storage facilities is not considered a relevant factor in determining whether or not a room is a sleeping room."

The term *"SITE"*, is hereby added to read as follows:

"**SITE.** A parcel of land bounded by a property line or a designated portion of a public right-of-way."

The term, *"TOWNHOUSE"*, is hereby amended to read as follows:

"**TOWNHOUSE:** A single-family dwelling unit constructed in a group of two or more attached individual units, each of which is separated from the other from the foundation to the roof and is located entirely on a separately recorded and platted parcel of land (site) bounded by property lines that is deeded exclusively for such single-family dwelling."

(21) ***Section 301.1.3 Engineered Design*** is hereby amended to read as follows:

"**R301.1.3 Engineered design.** When a building of otherwise conventional light-frame construction contains structural elements not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design, in accordance with the general building code enacted by the City, is permitted for all buildings, structures, and portions thereof included in the scope of this code."

(22) ***Table R301.2(1), Climatic and Geographic Design*** criteria, is hereby amended to read as follows:

GROUNDSNOW LOAD	WIND SPEED[b]	SEISMIC DESIGN CATE-GORY	SUBJECT TO DAMAGE FROM					WINTER DESIGN TEMP	AIR FREEZ-ING INDEX[f]	MEAN ANN-UAL TEMP.[g]	FLOOD[e] HAZARDS
			Weathering[a]	Roof Ice[c] Damming	Frost line depth	Termite	Decay[d]				
30psf (1436.4pa)	100mph (161 kph)	B	Severe	No	30 inches (762mm)	Slight to Moderate	None to Slight	+1° F (-17° C)	906	48.4	July 16, 1979

For SI: °C = [(°F)-32]/1.8.

a. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column is based on the weathering index (i.e., "severe") for concrete as determined from the Weathering Probability Map [Figure R301.2 (3)]. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.

b. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.

c. Based on the average daily temperature in January greater than 25^0 F (-4^0 C) or where the history of local damage from the effects of ice damming is not substantial.

d. None to slight in accordance with Figure R301.2(7).

e. Date of the City's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), or the date(s) of the currently effective FIRM and FBFM, or other flood hazard map adopted by the community.

f. 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32^o Fahrenheit) at www.ncdc.noaa.gov/fpsf.html.

g. Mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32^o Fahrenheit) at www.ncdc.noaa.gov/fpsf.html."

(23) ***Section R301.2.1.5.2 Basic Wind Speed*** is hereby added, to read as follows:

"**R301.2.1.5.2 Basic Wind Speed**. The Special Wind Region as indicated on Figure R301.2(4) of this code shall apply using a Basic Wind Speed of 100 miles per hour (161 kph) based on the exposure category as described in Section R301.2.1.4, or the equivalent pressure thereto."

(24) ***Section R302.1 Exterior walls,*** is hereby amended by adding a new exception #6 to read as follows:

"6. Walls of dwellings located within the fire separation distance (location from property line) of 3 feet to less than 5 feet shall be constructed of siding containing cementitious materials."

(25) ***Table R302.1 Exterior Walls*** is hereby amended to read as follows:

TABLE R302.1 EXTERIOR WALLS			
EXTERIOR WALL ELEMENT		**MINIMUM FIRE-RESISTANCE RATING**	**MINIMUM FIRE SEPARATION DISTANCE**
WALLS	FIRE-RESISTANCE RATED	1 HOUR-TESTED IN ACCORDANCE WITH ASTM E 119 OR UL 263 WITH EXPOSURE FROM BOTH SIDES	LESS THAN 3 FEET
	NOT FIRE RESISTANCE RATED	0 HOURS	3 FEET OR MORE
PROJECTIONS	FIRE-RESISTANCE RATED	1 HOUR ON THE UNDERSIDE	2 TO 3 FEET
	NOT ALLOWED	N/A	LESS THAN 2 FEET
OPENINGS IN WALLS	NOT ALLOWED	N/A	LESS THAN 3 FEET
	UNLIMITED	0 HOURS	3 FEET OR MORE
PENETRATIONS	ALL	COMPLY WITH SECTION R317.3	LESS THAN 3 FEET
		NONE REQUIRED	3 FEET OR MORE

(26) ***Section R302.2 Townhomes, exception*** is hereby amended to read as follows:

Exception: A common two-hour fire-resistance-rated wall assembly tested in accordance with ASTME 119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

(27) ***Section R302.2.1Continunity*** is hereby amended to read as follows:

"**R302.2.1 Continuity.** The fire-resistance-rated adjoining wall or assembly separating townhouses along property lines shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures."

(28) ***Section R302.3 Two-family dwellings*** is hereby amended to read as follows:

"**R302.3 Two-family dwellings.** Dwelling units in two-family dwellings shall be separated from each other by wall and/or floor assemblies having not less than a two-hour fire-

resistance rating or by 2 walls of one-hour fire-resistance rating when tested in accordance with ASTME 119 or UL 263. Fire-resistance-rated floor-ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

EXCEPTIONS:

1. A fire-resistance rating of one half-hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13R.

2. Wall assemblies in buildings equipped with a fire suppressions system complying with NFPA 13, 13R or IRC P2904, need not extend through attic spaces when the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board and an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the dwellings. The structural framing supporting the ceiling shall also be protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

3. A fire-resistance rating of 1 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904."

(29) ***Section R304.2 Other rooms exception*** is amended to read as follows:

"**R304.2 Other rooms.** Other habitable rooms shall have a floor area of not less than 70 square feet (6.5 m^2).

EXCEPTION:

Kitchens, toilet rooms and bathrooms."

(30) ***Section R304.3 Minimum dimensions exception*** is amended to read as follows:

"**R304.3 Minimum dimensions.** Habitable rooms shall not be less than 7 feet (2.134 m) in any horizontal dimension.

EXCEPTION:

Kitchens, toilet rooms and bathrooms."

(31) ***Section R305.1 Minimum height*** is hereby amended to read as follows:

"**R305.1 Minimum height.** Below grade habitable spaces, hallways, bathrooms, toilet rooms, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 84 inches (2134 mm). Above grade habitable rooms, hallways, corridors, bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 90 inches (2,286 mm). The required height shall be measured from the finish floor to the lowest projection from the ceiling."

(32) ***Section R310.2 Window Wells*** is amended by adding a new exception #2 to read as follows:

"2. With the window in the full open position, the bottom window well step may encroach a maximum of 12 inches (304 mm) into the minimum horizontal projection, provided the well meets the following criteria:

(a) The bottom of the well is not less than 36 inches wide (914 mm), centered horizontally on the openable portion of the emergency escape and rescue door or window, and

(b) An unobstructed clear horizontal projection of 36 inches (914 mm) is maintained at the centerline of the openable portion of the emergency escape and rescue door or window."

(33) ***Section R311.7.1 Stairways Width Exception*** is amended to read as follows:

"**EXCEPTION:**

The width of spiral stairways installed within individual dwelling units shall be in accordance with Section R311.7.9.1."

(34) ***Section R311.7.4 Stair treads and risers,*** is amended by deleting the second sentence:

"**R311.7.4 Stair treads and risers.** Stair treads and risers shall meet the requirements of this section.

(35) ***Section R311.7.4.1 Riser height*** is hereby amended to read as follows:

"**R311.7.4.1 Riser height**. The maximum riser height shall be 7 3/4 inches (196 mm), the minimum riser height shall be not less than 4 inches (102 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm)."

(36) ***Section R312.1.1 Area well retaining walls,*** is amended by adding a new section to read as follows:

"**R312.1.1 Area well retaining walls**. Where any area well wall, bulkhead enclosure wall or similar retaining wall or barrier is located less than 36 inches (914 mm) from the nearest intended walking surface, parking surface, or driveway and the surface elevation difference between the higher and lower side of the well wall, bulkhead enclosure wall, or retaining wall is greater than 36 inches, such wall shall be protected with guards or be provided with an equivalent barrier.

EXCEPTION:

1. The access side of stairways need not be barricaded.
2. Area wells provided for emergency escape and rescue windows may be protected with approved grates or covers that comply with Section R310.4.
3. Covers and grates may be used over stairways and other openings used exclusively for service access or for admitting light or ventilation.
4. Area well walls, bulkhead enclosure walls, or retaining walls adjacent to a building that are located 24 inches (610 mm) or less measured perpendicular from the building.
5. Locations where the slope of the embankment or the side of the enclosure or the opening adjacent to such walls does not exceed 2 horizontal to 1 vertical."

(37) ***Section R313 Automatic Fire Sprinkler Systems*** is hereby amended in its entirety to read as follows:

R313.1 Townhouse automatic fire sprinkler systems design. An automatic residential fire sprinkler system installed in townhouses shall be designed and installed in accordance with Section P2904 or NFPA 13R or NFPA 13.

R313.2 One- and two-family dwellings automatic fire systems design. An automatic residential fire sprinkler system installed in one and two-family dwellings shall be designed and installed in accordance with Section P2904 or NFPA 13D.

(38) ***Section R314.3.1 Alterations, repairs and additions***, is hereby amended by deleting exception #2.

(39) ***Section R320.1 Scope,*** is hereby amended to read as follows:

"**R320.1 Scope.** Where there are 4 or more dwelling units or sleeping units constructed in a single structure, or when constructed as part of a planned development containing a total of 7 or more dwelling units, regardless of whether such units are separated by fire-resistance-rated assemblies, the applicable provisions of Colorado Revised Statutes, Federal regulations, and the provisions of Chapter 11 of the adopted *International Building Code* for Group R-3 shall apply."

(40) ***Section R322.1 General*** is amended to read as follows:

"**R322.1 General.** Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with the provisions contained in this section. In addition to complying with the provisions of this section, buildings and structures constructed in flood hazard areas shall be designed and constructed in accordance with the provisions of the Code of the City, Chapter 10, Flood Prevention and Protection.

In riverine flood hazard areas where design flood elevations are specified but floodways have not been designated, the applicant shall demonstrate that the cumulative effect of the proposed buildings and structures on design flood elevations, including fill, when

combined with all other existing and anticipated development, will not increase the design flood elevation more than one foot at any point within the City."

(41) ***Section R401.1 Application*** is hereby amended to read as follows:

"**R401.1 Application.** The provisions of this chapter shall control the design and construction of the foundation and foundation spaces for all buildings. In addition to the provisions of this chapter, the design and construction of foundations in areas prone to flooding as established by Table R301.2(1) shall meet the provisions of Section R322. All foundations shall be designed by a qualified professional licensed in the State of Colorado. Such designs shall be performed in accordance with accepted and approved engineering practices, including considerations for soil load-bearing capacities, surface and subsurface water conditions, adequate foundation and floor drainage, adequate ventilation of enclosed interior foundation spaces, and foundation waterproofing and dampproofing.

EXCEPTION:

Foundations for accessory buildings and minor additions unlikely to be located on expansive, compressible, or shifting soils, soils of unknown characteristics, or for other valid reasons as determined by the building official, need not be designed by a licensed professional.

Wood foundations in Seismic Design Category D0, D1 or D2 shall be designed in accordance with accepted engineering practice.

EXCEPTION:

The provisions of this chapter shall be permitted to be used for wood foundations only in the following situations:

1. In buildings that have no more than two floors and a roof.

2. When interior basement and foundation walls are constructed at intervals not exceeding 50 feet (15 240 mm)."

(42) ***Section, R401.5 Placement of Backfill*** is hereby added to read as follows:

"**R401.5 Placement of Backfill**. The excavation outside the foundation, including utility trenches and excavation ramp, shall be backfilled with soil that is substantially free of organic material, construction debris and cobbles, boulders, and solid soil masses larger than 6 inches (152 mm) diameter; or of frozen soil. The backfill shall be placed in lifts and compacted as set forth in the engineering documents. The backfill shall be placed in a manner that does not damage the foundation or the waterproofing or dampproofing material. Excavation ramps shall be backfilled in such a manner that the ramp does not become a conduit for surface water to flow toward the foundation. Where excavations include more than one house, a specially engineered drainage system may be required by the building official."

(43) ***Section R403.1.4.1Frost Protection Exceptions*** is hereby amended to read as follows:

"**EXCEPTIONS:**

1. Freestanding accessory structures with an area of 400 square feet (37 m^2) or less and an eave height of 120 inches (3.048 m) or less shall not be required to be protected.

2. Decks not supported by a dwelling need not be provided with footings that extend below the frost line."

(44) ***Section R405.1 Concrete or masonry foundations,*** is hereby amended to read as follows:

"**R405.1 Concrete or masonry foundations**. "Drains consisting of piping conforming with ASTM Designation D2729-89 shall be provided adjacent to the lowest concrete or masonry foundations that retain earth and enclose spaces that are partially or entirely located below grade. Unless perimeter drains are designed to daylight, they shall terminate in sump pits with an electrical power source permanently installed within 36 inches (914 mm) of the sump opening. Piping for sump pumps shall discharge at least 60 inches (1524 mm) away from foundations or as otherwise approved by the building official. Drains shall be installed in bedding materials that are of such size and installed in such manner to allow ground water to seep into the perimeter drain. Filter fabric or other measures to restrict the passage of fines shall be used to further protect the perimeter drain from blockage.

EXCEPTION:

A drainage system is not required when the foundation is installed on well-drained ground or sand gravel mixture soils according to the Unified Soil Classification System, Group I Soils, as detailed in Table R405.1."

(45) ***Section R405.3 Landscape irrigation***, is added to read as follows:

"**R405.3 Landscape irrigation**. Landscape irrigation systems shall be installed such that the ground surface within 60 inches (1524 mm), measured perpendicular from the foundation, is not irrigated."

(46) ***Section R408.1Ventilation*** is hereby amended to read as follows:

"**R408.1 Ventilation.** The under-floor space between the bottom of the floor joists and the earth under any building (except space occupied by a basement) shall have ventilation openings through foundation walls or exterior walls. All exposed ground surfaces shall be covered by a Class 1 vapor retarder material. All joints in the retarder shall be overlapped by 6 inches (153 mm) and sealed or taped, with the retarder edges extending a minimum of 6 inches (153 mm) up the foundation wall and attached and sealed thereto in an approved manner. The minimum net area of ventilation openings shall not be less than 1 square foot

(0.0929 m2) for each 1,500 square feet (140 m2) of under-floor space area. One such ventilating opening shall be within 3 feet (914 mm) of each corner of the building."

(47) ***Section R408.2.1 Ventilated under-floor spaces,*** is hereby added to read as follows:

"**R408.2.1 Ventilated under-floor spaces.** Floor systems above ventilated under-floor spaces shall be insulated to R-30 in accordance with the adopted *International Energy Conservation Code* Table 402.1.1. Floor system shall be sealed to prevent heat loss and air infiltration."

(48) ***Section R408.3 Unvented crawl space, Item 3*** is hereby added to read as follows:

"3. The perimeter walls enclosing un-vented crawl spaces shall be thermally insulated to R-10 continuous insulated sheathing or R-13 batt insulation in accordance with the adopted *International Energy Conservation Code* Table 402.1.1."

(49) ***Section R408.3.1 Spaces under below-grade floors***, is hereby added to read as follows:

"**R408.3.1 Spaces under below-grade floors**. Mechanical ventilation systems for spaces under below-grade floors shall designed by a professional engineer."

(50) Section, ***R408.6 Finished grade*** is hereby amended by adding a sentence at the end to read as follows:

"In areas where expansive or collapsible soils are known to exist, under floor clearances shall be provided in accordance with the professional designed foundation system."

(51) ***Section R801.3 Roof Drainage*** is hereby amended to read as follows:

"**R801.3 Roof drainage.** All dwellings shall have a controlled method of water disposal from roofs that will collect and discharge all roof drainage to the ground surface at least 5 feet (1.524 m) from foundation walls or to an approved drainage system. Devices shall not be installed that restrain in any way or that otherwise interfere with downspout extensions being fully extended. Landscape edging shall not interfere with the discharge of the roof drainage system. Downspout extensions shall terminate above ground or at an approved location."

(52) ***Section R902.1 Roofing Covering Materials*** is hereby amended to read as follows:

"**R902.1 Roofing covering materials.** Except as otherwise allowed, roofs shall be covered with materials listed as Class A and with materials as set forth in Sections R904 and R905. Classes A, B and C roofing required to be listed by this section shall be tested in accordance with UL 790 or ASTM E 108. Roof assemblies with coverings of brick, masonry, slate, clay or concrete roof tile, exposed concrete roof deck, ferrous or copper shingles or sheets, and metal sheets and shingles, shall be considered Class A roof coverings.

EXCEPTION:

Any Class B or Class C roof covering may be applied on any new construction that is added to an existing building, provided the roof extremities of such existing building and new construction are located a minimum distance of 5 feet (1.524 m) from the nearest adjacent property line and are a minimum distance of 10 feet (3.048 m) from another building."

(53) ***Section R905.2.8.3Sidewall Flashing*** is amended by the addition of an exception to read as follows:

"**EXCEPTION:**

For re-roofing where step flashing would require the removal of siding material, provided adequate flashing is installed."

(54) ***Section R905.2.8.5 Drip edge*** is amended by adding a new section to read as follows:

"**R905.2.8.5 Drip edge.** Provide drip edge at eaves and gables of shingle roofs. Overlap to be a minimum of 2 inches (51 mm). Eave drip edges shall extend 1/4 inch (6.4 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Eave drip edges shall be installed under the underlayment and the underlayment shall extend over the eave drip edge a minimum of ¼ inch. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) o.c. Gable drip edges shall be installed over the underlayment."

(55) ***Section R907.1 General*** is hereby amended to read as follows:

"**R907.1 General.** Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 9. No portion of an existing nonrated roof covering may be permanently replaced or covered with more than one square of nonrated roof covering.

EXCEPTIONS:

1. Reroofing shall not be required to meet the minimum design slope requirement of one-fourth vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide positive roof drainage.

2. Any existing roof covering system may be replaced with a roof covering of the same materials and classification, provided the replacement roof covering has a minimum rating of Class C."

(56) ***Section R1003.9.1 Spark arrestors,*** is hereby amended to read as follows:

"**R1003.9.1 Spark arrestors**. Chimneys attached to any appliance or fireplace that burns solid fuel shall be equipped with an approved spark arrester meeting all of the following requirements:

1. The net free area of the arrestor shall not be less than four times the net free area of the outlet of the chimney flue it serves.
2. The arrestor screen shall have heat and corrosion resistance equivalent to 19-gage galvanized steel or 24-gage stainless steel.
3. Openings shall not permit the passage of spheres having a diameter greater than 1/2 inch (12.7 mm) nor block the passage of spheres having a diameter less than 3/8 inch (9.5 mm).
4. The spark arrestor shall be accessible for cleaning and the screen or chimney cap shall be removable to allow for cleaning of the chimney flue."

(57) ***Section R1004.1 General*** is hereby amended by adding new sentence at the end to read as follows:

"Solid fuel fireplaces, fireplace stoves and solid-fuel-type room heaters shall also comply with Section 5-110 of the Code of the City."

(58) ***Section R1004.4 Unvented Gas log Heaters*** is amended by deleting in its entirety.

(59) ***Section N1101.1.1 Thermal design parameters,*** is amended by adding the following to read as follows:

"**N1101.1.1 Thermal design parameters**. The following thermal design parameters in Table N1101.1 shall be used for calculations required under this chapter.

TABLE N1101.1
THERMAL DESIGN PARAMETERS
"CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

Winter Outdoor, Design Dry-bulb (°F)	= 4
Winter Indoor, Design Dry-bulb (°F)	= 72
Summer, Outdoor Design Dry-bulb (°F)	= 89
Summer, Indoor Design Dry-bulb (°F)	= 75
Summer, Design Wet-bulb (°F)	= 62
Degree days heating	= 6368
Degree days cooling	= 479

For SI: °C = [(°F)-32]/1.8."

(60) ***Section M1307.3 Elevation of ignition source*** is amended to read as follows:

"**Section M1307.3 Elevation of ignition source.** Electrical devices, equipment and appliances having an ignition source shall be elevated such that the source of ignition is not less than 18 inches (457 mm) above the floor in garages. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate with a private garage through openings shall be considered to be part of the garage."

(61) ***Section, M1401.3 Sizing and testing*** is hereby amended to read as follows:

"**M1401.3 Sizing and testing.** Heating and cooling equipment shall be sized based on building loads calculated in accordance with *ACCA Manual J, 8th* (or current) *Edition and ACCA Manual S (current edition)* or other approved heating and cooling calculation methodologies. The total sensible capacity of the cooling equipment shall not exceed the total sensible load by more than 15 percent for cooling-only applications; or by more than 25 percent for cold-climate applications in accordance with the procedures in *ACCA Manual J, 8th* (or current) *Edition,* using thermal design parameters in Table 302.1. All ducted air-distribution heating and cooling systems shall be sized using cooling loads. All heating and cooling equipment shall be tested to ensure such equipment is operating within the manufacturer's recommended operating parameters and standards, including within such parameters and standards for sufficient combustion, according to the applicable protocols established by the building official and in accordance with the mechanical code adopted by the City."

(62) ***Section, M1414.1 General*** is hereby amended to read as follows:

"**M1414.1General.** Fireplace stoves shall be listed, labeled and installed in accordance with the terms of the listing. Fireplace stoves shall be tested in accordance with UL 737. Wood burning appliances shall meet the latest emission standards as stated by the State of Colorado and Federal Regulation 40 CFR Part 60, Subpart AAA."

(63) ***Section M1501.1 Outdoor discharge*** is hereby amended to read as follows:

"**M1501.1 Outdoor discharge.** The air removed by every mechanical exhaust system shall be discharged to the outdoors such that the exhausted air is not returned indoors by mechanical ventilating systems. Air shall not be exhausted into an attic, soffit, ridge vent or crawl space.

EXCEPTION:

Whole-house ventilation-type attic fans that discharge into the attic space of dwelling units having private attics shall be permitted."

(64) ***Section M1501.2 Indoor depressurization*** is hereby added to read as follows:

"**M1501.2 Indoor depressurization.** Ducted exhaust systems shall not induce or create a negative pressure sufficient to cause backdrafting of naturally vented, open combustion-chamber, fuel-burning appliances, or create negative pressure in excess of negative 3 Pa. in the immediate proximity of combustion chambers of such appliances."

(65) ***Section M1502.4.4.1 Specified length*** is hereby amended to read as follows:

"**M1502.4.4.1 Specified length.** The maximum length of the exhaust duct shall be 35 feet (10668 mm) from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are used, the maximum length of the exhaust duct shall be reduced in accordance with Table M1502.4.4.1."

(66) ***Section M1502.4.4.2 Manufacturer's instructions***, is hereby deleted in its entirety.

(67) ***Section M1601.1 Duct design*** is hereby amended to read as follows:

"**M1601.1 Duct design.** Duct systems serving heating, cooling and ventilation equipment shall be fabricated and sized in accordance with the provisions of this section and *ACCA Manual D* or other approved methods."

(68) ***Section M1601.1.1 Above-ground duct systems Item 7.5*** is hereby added to read as follows:

"7.5 Stud wall cavities and joist-space plenums used to convey air shall be tested for air-tightness."

(69) ***Section, M1601.4.10 Construction debris and contamination*** is hereby added to read as follows:

"**M1601.4.10 Construction debris and contamination**. Mechanical air-handling systems and their related ducts shall be protected from the entrance of dirt, debris, and dust during the construction and installation process. Prior to passing final inspection or issuance of a Certificate of Occupancy, such systems shall be substantially free of construction-related contaminants."

(70) ***Section G2406.2 (303.3) Prohibited locations*** is hereby amended by deleting exceptions 3. and 4.

(71) ***Section G2407.11 (304.11) Combustion air ducts exception to Item, 1*** is hereby amended to read as follows:

"**EXCEPTION:**

Where the installation of galvanized steel ducts is not practical due to existing finish materials within dwelling units that are undergoing alteration or reconstruction, unobstructed stud and joist spaces shall not be prohibited from conveying combustion air, provided that not more than one required fireblock is removed."

This section is hereby further amended by adding item, 9 to read as follows:

"9. All combustion air openings or ducts shall be readily identifiable with an approved label or by other means warning persons that obstruction of such openings or ducts may cause fuel-burning equipment to release combustion products and dangerous levels of carbon

monoxide into the building."

(72) ***Section G2408.2 (305.3) Elevation of ignition source*** is hereby amended by deleting the exception.

(73) ***Section G2409.4.5 (308.4.6) Clearance from supply ducts*** is hereby amended to read as follows:

"**G2409.4.5 (308.4.6) Clearance from supply ducts.** Central-heating furnaces where the bonnet temperature exceeds 150 °F (68 °C), shall have the clearance from supply ducts within 3 feet (0.914 m) of the furnace plenum be not less than that specified from the furnace plenum. No clearance is necessary beyond this distance."

(74) ***Section G2415.10 (404.10) Minimum burial depth*** is hereby amended to read as follows:

"**G2415.10 (404.10) Minimum burial depth.** Underground piping systems shall be installed a minimum depth of 18 inches (457 mm) below grade, except as provided for in Section G2415.9.1."

(75) ***Section G2415.10.1 (404.10.1) Individual outside appliance*** is hereby amended to read as follows:

"**G2415.10.1 (404.10.1) Individual outside appliances.** Individual lines to outside lights, grills or other appliances shall be installed a minimum of 18 inches (457 mm) below finished grade.

EXCEPTION:

Approved materials installed a minimum of 6 inches (152 mm) below finished grade when covered with a concrete slab 4 inches (102 mm) in minimum thickness."

(76) ***Section G2415.13 (404.13) Outlet closure*** is hereby amended to read as follows:

"**G2415.13 (404.13) Outlet closures.** Gas outlets and fittings which allow for future gas line expansion that do not connect to appliances shall be provided with an approved gas shutoff valve with the end capped gas tight."

(77) ***Section G2416.1 (405.1) General*** is hereby amended to read as follows:

"**G2416.1 (405.1) General.** Changes in direction of rigid metallic pipe specified in G2414.4 shall be made only by the use of fittings and factory bends."

(78) ***Section G2416.2 (405.2) Metallic pipe*** is hereby deleted in its entirety.

(79) ***Section G2417.4.1 (406.4.1) Test pressure*** is hereby amended to read as follows:

"**G2417.4.1 (406.4.1) Test pressure.** The test pressure to be used shall be not less than one and one-half times the proposed maximum working pressure, but not less than 10 psig (67 kPa gauge) irrespective of design pressure. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe."

(80) ***Section G2420.5.2 (409.5.2) Vented decorative appliances and room heaters*** is hereby amended to read as follows:

"**G2420.5.2 (409.5.2) Vented decorative appliances and room heaters.** Shutoff *valves* for vented decorative *appliances*, room heaters and decorative *appliances* for installation in vented fireplaces shall be permitted to be installed in an area remote from the *appliances* where such *valves* are provided with *ready access*. Such *valves* shall be permanently identified and shall serve no other *appliance*. Remote valves shall be operable on the same floor as the appliance served and within 12 feet (3.658 m) of the appliance as measured along the floor line. The *piping* from the shutoff *valve* to within 6 feet (1829 mm) of the *appliance* shall be designed, sized and installed in accordance with Sections G2412 through G2419."

(81) ***Section G2421.3 (410.3) Venting of regulators*** is hereby amended to read as follows:

"**G2421.3 (410.3) Venting of regulators.** Pressure regulators that require a vent shall have an independent vent to the outside of the building. The vent shall be designed to prevent the entry of water or foreign objects. Vents shall not terminate within 3 feet (0.916 m) of openings into the building."

(82) ***Section G2425.8 (501.8) Appliances not required to be vented*** is hereby amended by deleting item 7.

(83) ***Section G2439.1 (614.1) Installation*** is hereby amended to read as follows:

"**G2439.1 (614.1) Installation.** Clothes dryers shall be exhausted in accordance with the manufacturer's instructions. Dryer exhaust systems shall be independent of all other systems and shall convey the moisture and any products of combustion to the outside of the building.

(84) ***Section G2439.5.5.2 (614.6.5.2) Manufacturer's instructions***, is hereby deleted in its entirety.

(85) ***Section G2445 (621), UNVENTED ROOM HEATERS***, is hereby deleted in its entirety.

(86) ***Section G2447.6 Kitchens with gas ovens*** is hereby added to read as follows:

"**G2447.6 Kitchens with gas ovens**. Kitchens with gas ovens shall be supplied with an exhaust system vented to the outside. Ducts serving kitchen exhaust systems shall not

terminate in an attic or crawl space or areas inside the building and shall not induce or create a negative pressure in excess of negative 3 Pa or adversely affect gravity-vented appliances."

(87) ***Section P2713.3 Bathtub and whirlpool bathtub valves,*** is amended by adding the exception to read as follows:

"**EXCEPTION:**

Bathtubs and whirlpool bathtubs without connected showers."

(88) ***APPENDIX E, MANUFACTURED HOUSING USED AS DWELLINGS***, is hereby adopted in its entirety.

(89) ***APPENDIX F, RADON CONTROL METHODS***, is hereby adopted and amended in its entirety to read as follows:

"Appendix F – RADON CONTROL METHODS

SECTION AF101 TITLE, SCOPE AND PURPOSE

AF101.1 Title. These provisions shall be known as *Appendix Chapter F, the FORT COLLINS RADON RESISTANT CONSTRUCTION CODE FOR ONE- AND TWO-FAMILY DWELLINGS*, and shall be cited as such and will be referred to herein as this appendix.

AF101.2 Scope. The provisions of this appendix shall apply to new one- and two-family dwellings completely separated from adjacent dwellings by unobstructed physical space (detached) and multiple, attached single-family dwellings (townhouses) not more than three stories in height and with each townhouse having its own separate means of egress.

AF01.3 Purpose. The purpose of this appendix is to provide minimum requirements to enhance the public safety, health and general welfare, through construction methods designed and installed to resist entry of radon gas into the occupied spaces of buildings regulated by this appendix.

SECTION AF102
DEFINITIONS

AF102.1 General. For the purpose of these requirements, the terms used shall be defined as follows:

DWELLING UNIT, SINGLE-FAMILY DETACHED. An independent building completely separated from adjacent dwellings by unobstructed physical space, exclusively containing one dwelling unit located entirely on a separately recorded and platted parcel of land (site) bounded by property lines, and which parcel is deeded exclusively for such single-family dwelling.

DWELLING UNIT, TWO-FAMILY DETACHED. An independent building completely

separated from adjacent dwellings by unobstructed physical space, exclusively containing two dwelling units located entirely on a separately recorded and platted parcel of land (site) bounded by property lines, and which parcel is deeded exclusively for such two-family dwelling.

FOUNDATION DRAIN SYSTEM. A continuous length of drain tile, perforated pipe, or filter mat extending around all or part of the internal or external perimeter of a basement or crawl space footing designed to collect and drain away excess subsurface water.

RADON. A naturally occurring, chemically inert, radioactive gas that is not detectable by human senses and can move readily through particles of soil and rock and can accumulate under the slabs and foundations of homes where it can easily enter the living space through construction cracks and openings.

SOIL-GAS-RETARDER. A continuous membrane of 3-mil (0.075 mm) cross-linked polyethylene or other equivalent material used to retard the flow of soil gases into a building.

SUBFLOOR. A concrete slab and other approved permanent floor system that directly contacts the ground and is within the walls of the living spaces of the building.

SUB-MEMBRANE DEPRESSURIZATION SYSTEM. A system designed to achieve lower sub-membrane air pressure relative to crawl space air pressure by use of a vent drawing air from beneath the soil-gas-retarder membrane.

SUB-SLAB DEPRESSURIZATION SYSTEM (Passive). A system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a vent pipe routed through the conditioned space of a building and connecting the sub-slab area with outdoor air, thereby relying on the convective flow of air upward in the vent to draw air from beneath the slab.

TOWNHOUSE. A single-family dwelling unit constructed as part of a group of two or more attached individual dwelling units, each of which is separated from the other from the foundation to the roof and is located entirely on a separately recorded and platted parcel of land (site) bounded by property lines, and which parcel is deeded exclusively for such single-family dwelling.

SECTION AF103 REQUIREMENTS

AF103.1 General. The following required construction methods are intended to resist radon entry and prepare the building for post-construction radon mitigation (see Figure AF102).

AF103.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all subfloors. The gas-permeable layer shall consist of one of the following methods except that where fills of aggregate size less than that described in Method 1are used beneath a slab, Method 2,3, 4, or 5 must be used.

1. A uniform layer of clean aggregate, a minimum of 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a

1/4 -inch (6.4 mm) sieve. In buildings where interior footings or other barriers separate sub-grade areas, penetrations through the interior footing or barrier equal to a minimum of 12 square inches (0.094 m^2) per 10 feet (3.048 m) of barrier length shall be provided. A minimum of two penetrations shall be provided per separation and be evenly spaced along the separation.

EXCEPTION:

In buildings where interior footings or other barriers separate the sub-grade area, separate radon vent pipes may be installed for each sub-grade area as specified in Section AF103.5.2 in lieu of penetrations through the barrier.

2. A foundation drain pipe system installed under concrete floor slab areas less than 2,000 square feet (186 m^2), consisting of a continuous loop of minimum 3-inch (76 mm.) diameter perforated pipe shall be laid in the sub-grade with the top of pipe located 1 inch (25.4 mm) below the concrete slab. The pipe may be rigid or flexible but shall have perforations fully around the circumference with a free air space equal to 1.83 square inches per square foot (127 cm^2/ m^2) of exterior pipe surface area. Such pipe shall be wrapped with approved filter material to prevent blocking of pipe perforations. The pipe loop shall be located inside of the exterior perimeter foundation walls not more than 12 inches (305 mm) from the perimeter foundation walls. In buildings where interior footings or other barriers separate the sub-grade area, the loop of pipe shall penetrate, or pass beneath such interior footings or barriers. For slab areas greater than 2,000 square feet (186 m^2) but less than 4,000 square feet (372 m^2), the preceding configuration may be used provided a minimum of 4-inch diameter (102 mm) pipe is installed. Slabs in excess of 4,000 square feet (372 m^2) shall have under them separate loops for every additional 2,000 square feet (186 m^2) of slab area when 3-inch (76 mm) diameter pipe is used; or, slabs may have separate loops provided for each additional increment in area between 2,000 square feet (186 m^2) and 4,000 square feet (372 m^2) when 4-inch (102 mm) diameter pipe is used.

3. A foundation drain soil gas collection mat system installed under concrete floor slab areas of 2,000 square feet (186 m^2) or less, consisting of a continuous rectilinear loop of soil gas collection mat or drainage mat having minimum dimensions of 1 inch in height by 12 inches in width (25.4 mm in height x 305 mm in width) and a nominal cross-sectional air flow area of 12 square inches (0.0078 m^2) may be laid on top of the sub-grade. The mat shall be constructed of a matrix that allows for the movement of air through it and be capable of supporting the concrete placed upon it. The matrix shall be covered by approved filter material on all four sides to prevent dirt or concrete from entering the matrix. All breaches and joints in the filter material shall be repaired prior to the placement of the slab. The loop shall be located inside the exterior perimeter foundation walls and within 12 inches (305 mm) from the perimeter foundation walls. In buildings where interior footings or other barriers separate the sub-grade area, the mat shall penetrate these interior footings or barriers to form a continuous loop around the exterior perimeter.

Slabs larger than 2,000 square feet (186 m^2) but less than 4,000 square feet (372 m^2) shall have under them an additional strip of mat that bisects the loop forming two areas

approximately equally divided by the two halves of the rectilinear loop. Slabs larger than 4,000 square feet (372 m^2) shall have separate loops for each 2,000 (186 m^2) square feet; or, increased to 4,000 square feet (372 m^2) when a loop is bisected as specified in the preceding configuration.

4. A uniform layer of sand (native or fill), a minimum of 4 inches (102 mm) thick, overlain by a layer or strips of geo-textile drainage matting designed to allow the lateral flow of soil gases.

5. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire sub-floor area.

AF103.3 Entry routes. Potential radon entry routes shall be closed in accordance with Sections AF103.3.1 through AF103.3.11.

AF103.3.1 Floor openings. Openings around bathtubs, showers, water closets, pipes, wires or other objects that penetrate concrete slabs or other floor assemblies shall be filled with a polyurethane caulk or equivalent sealant applied in accordance with the manufacturer's recommendations.

AF103.3.2 Concrete joints. All control joints, isolation joints, construction joints and any other joints in concrete slabs or between slabs and foundation walls shall be sealed with a caulk or sealant. Gaps and joints shall be cleared of loose material and filled with polyurethane caulk or other elastomeric sealant applied in accordance with the manufacturer's recommendations.

AF103.3.3 Condensate drains. Condensate drains shall be trapped or routed through non-perforated pipe to daylight.

AF103.3.4 Sumps. Sump pits open to soil or serving as the termination point for sub-slab or exterior drain tile loops shall be covered with a gasketed or otherwise sealed lid. Sumps used as the suction point in a sub-slab depressurization system shall have a lid designed to accommodate the vent pipe. Sumps used as a floor drain shall have a lid equipped with a trapped inlet and view port.

AF103.3.5 Foundation walls. Hollow block masonry foundation walls shall be constructed with either a continuous course of solid masonry, one course of masonry grouted solid, or a solid concrete beam at or above finished ground surface to prevent passage of air from the interior of the wall into the living space. Where a brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be sealed. Joints, cracks or other openings around all penetrations of both exterior and interior surfaces of masonry block or wood foundation walls below the ground surface shall be filled with polyurethane caulk or equivalent sealant. Penetrations of concrete walls shall be filled.

AF103.3.6 Dampproofing. The exterior surfaces of portions of concrete and masonry

block walls below the ground surface shall be damp-proofed in accordance with Section R406 of this appendix.

AF103.3.7 Air-handling units. Air-handling units in crawl spaces shall be sealed to prevent air from being drawn into the unit.

EXCEPTION:

Units with gasketed seams or units that are otherwise sealed by the manufacturer to prevent leakage.

AF103.3.8 Ducts. Ductwork passing through or beneath a slab shall be of seamless material unless the air-handling system is designed to maintain continuous positive pressure within such ducting. Joints in such ductwork shall be sealed to prevent air leakage. Ductwork located in crawl spaces shall have all seams and joints sealed by closure systems in accordance with Section M1601.3.1.

AF103.4 Sub-membrane depressurization system. In buildings with interior structural floors directly above under-floor spaces containing exposed soil surfaces that are not protected by a sub-slab depressurization system, the following components of a sub-membrane depressurization system shall be installed during construction.

EXCEPTION:

Buildings in which an approved mechanical ventilation system complying with Section R408 or such other equivalent system that provides equivalent depressurization across the entire sub-membrane area as determined by the building official is installed in the under-floor spaces.

AF103.4.1Ventilation. Crawl spaces and similar under-floor spaces shall be provided with ventilation complying with Section R408.

AF103.4.2 Soil-gas-retarder. The exposed soil in under-floor spaces shall be covered with a continuous layer of soil-gas-retarder. Such ground cover joints shall overlap 6 inches (152 mm) and be sealed or taped. The edges of the ground cover shall extend a minimum of 6 inches (152mm) up onto all foundation walls enclosing the under-floor space and shall be attached and sealed to foundation walls in an approved manner.

AF103.4.3 Vent pipe riser. A plumbing tee or other approved connection shall be inserted horizontally beneath the sheeting and connected to a 3- or 4-inch-diameter (76 mm or 102 mm) fitting with a vertical vent pipe installed through the sheeting. The vent pipe shall be extended up through the building floors, terminate at least 12 inches (305 mm) above the roof in a location at least 10 feet (3.048 m) away from any window or other opening into the conditioned spaces of the building that is less than 2 feet (0.610 m) below the exhaust point, and 10 feet (3.048 m) from any window or other opening in adjoining or adjacent buildings.

AF103.5 Sub-slab depressurization system. The following components of a sub-slab depressurization system shall be installed during construction under basement or slab-on-grade floors.

AF103.5.1 Vent pipe riser. A minimum 3-inch-diameter (76 mm) ABS or PVC DWV pipe, or equivalent gas-tight pipe shall be embedded vertically into the sub-slab aggregate or other permeable material before the slab is cast. A "T" fitting or equivalent method shall be used to ensure that the pipe opening remains within the sub-slab permeable material. Alternatively, the 3-inch (76 mm) pipe shall be inserted directly into an interior perimeter drain tile loop or through a sealed sump cover where the sump is exposed to the sub-slab aggregate or connected to it through a drainage system.

All vent pipes shall be extended up through the building floors and terminate at least 12 inches (305 mm) above the surface of the roof in a location at least 10 feet (3.048 m) away from any window, air intake, or other opening into the conditioned spaces of the building that is less than 2 feet (0.610 m) below the exhaust point, and 10 feet (3.048 m) from any window or other opening in adjoining or adjacent buildings. The discharge end of vent pipe terminations shall be unobstructed and protected from small animal entry with a corrosion-resistant screen having openings between .25 inch (6.4 mm) and .5 inch (12.7 mm).

AF103.5.2 Multiple vent pipes. In buildings where interior footings or other barriers separate the sub-slab aggregate or other gas-permeable material, each area shall be fitted with an individual vent pipe. Vent pipes shall connect to a single vent that terminates above the roof or each individual vent pipe shall terminate separately above the roof.

AF103.6 Vent pipe drainage. All components of the radon vent pipe system shall be installed to provide positive drainage to the ground beneath the slab or soil-gas retarder.

AF103.7 Vent pipe accessibility. Radon vent pipes shall be accessible for fan installation through an attic or other area outside the habitable space.

EXCEPTION:

The radon vent pipe need not be accessible in an attic space where an approved roof-top electrical supply is provided.

AF103.8 Vent pipe identification and notification. All exposed and visible interior radon vent pipes shall be conspicuously identified with at least one label on each floor and in attics provided with access openings. The label shall read substantially as follows: Radon Reduction System. In addition to the preceding label, a notice shall be placed in a conspicuous area near the vent pipe that states the following:

THIS RADON REDUCTION SYSTEM IS NOT REQUIRED TO BE TESTED AND IS A (PASSIVE) SYSTEM, RELYING ENTIRELY ON NATURAL VENTILATION. OCCUPANTS ARE ADVISED TO TEST FOR RADON AND TAKE REMEDIAL ACTION AS NECESSARY BY INSTALLING A CONTINUOUSLY-OPERATING FAN

LOCATED IN THE VENT PIPE (ACCESS TYPICALLY PROVIDED IN THE ATTIC) AND CONNECTED TO THE NEARBY PROVIDED ELECTRICAL OUTLET. Call 1-800-767-RADON FOR MORE INFORMATION.

AF103.9 Combination foundations. Combination basement/crawl space or slab-on-grade/crawl space foundations shall have separate radon vent pipes installed in each type of foundation area. Each radon vent pipe shall terminate above the roof or shall be connected to a single vent that terminates above the roof.

AF103.10 Building depressurization. Joints in air ducts and plenums in unconditioned spaces shall be substantially air tight and permanently sealed with an approved sealant, mastic, or other approved methods. Thermal envelope air infiltration requirements shall comply with the energy conservation provisions in the energy conservation code currently enacted by the City. Firestopping shall be in conformance with the most recent general building code enacted by the City or meet the requirements contained in Section R602.8.

AF103.11 Provisions for future depressurization fan installation. Permanent provisions shall be made for the future installation of an in-line fan to be connected to every radon vent pipe. Such designated fan locations shall be outside of the conditioned envelope of the building, such as in the attic, garage and similar locations, excluding crawl spaces and other interior under-floor spaces. Designated locations shall accommodate an unobstructed permanent cylindrical space with the following minimum dimensions: 12 inches (305 mm) measured radially around the radon vent pipe along a vertical distance of 30 inches (760 mm). Designated fan locations shall be permanently accessible for servicing and maintenance. An electrical circuit shall be provided within 4 feet (1.219 m) of and within sight from designated fan locations. Such circuit shall have a means of positive disconnection and be terminated in an approved electrical outlet in accordance with the applicable current electric code.

AF103.12 Depressurization fan system activation. When a passive system as constructed in accordance with this appendix is to be converted to an active system, an approved in-line fan shall be installed in a designated fan location as specified in Section AF103.11.1. Additionally, an approved permanent electric light fixture and in-line pipe couplings that facilitate fan replacement shall be provided. The in-line fan shall be designed to operate continuously for a period of not less than five years and have a minimum air-flow rating as established by the building official. A readily accessible manometer or other approved warning device that notifies occupants of a fan malfunction by a visible or audible signal shall be installed within the dwelling unit. A separate permit shall be required for installation of such fan when it is not installed at the time the building is originally approved for occupancy."

(90) ***APPENDIX G, SWIMMING POOLS, SPAS, AND HOT TUBS***, is hereby adopted in its entirety.

(91) Section AG 105.6 Barrier around decorative pools, fountains, and ponds is hereby added to read as follows:

"**AG105.6 Barriers around decorative pools, fountains, and ponds.** Decorative pools,

fountains, and ponds which can contain water deeper than 24 inches (610 mm), shall be protected by barriers installed in accordance with section AG105.2."

(92) ***APPENDIX H, PATIO COVERS***, is hereby adopted in its entirety.

(93) ***APPENDIX J, EXISTING BUILDINGS AND STRUCTURES***, is hereby adopted in its entirety.

Introduced, considered favorably on first reading, and ordered published this 7th day of September, A.D. 2010, and to be presented for final passage on the 21st day of September, A.D. 2010.

Mayor

ATTEST:

City Clerk

Passed and adopted on final reading on the 21st day of September, A.D. 2010.

Mayor

ATTEST:

City Clerk