ORDINANCE NO. 022, 2022
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 2018
INTERNATIONAL ENERGY CONSERVATION CODE AND ADOPTING THE
2021 INTERNATIONAL ENERGY CONSERVATION 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 nine interconnected basic construction codes under one publication year; and

WHEREAS, the nine interconnected basic construction codes are the *International Building Code, International Residential Code, International Mechanical Code, International Fuel Gas Code, International Energy Conservation Code, International Property Maintenance Code, International Swimming Pool and Spa Code, International Existing Building Code,* and the *International Plumbing Code* to the extent adopted by the *Colorado Plumbing Code*; and

WHEREAS, the City Council has determined that the 2021 publication year of the nine interconnected basic construction codes ought to be adopted and that any counterpart *International* codes previously adopted should be repealed, both to align the publication years of the codes and also because the 2021 publications contain improvements in construction code regulation; and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 nine interconnected basic construction codes has been presented to community groups and feedback has been received from the Water Commission, Energy Board, Commission on Disability, Natural Resource Advisory Board, Poudre Fire Authority Board, Building Review Commission, Affordable Housing Board, and Air Quality Advisory Board; and

WHEREAS, the City Council has determined that it is in the best interest of the health, safety and welfare of the City and its citizens that the *2021 International Energy Conservation Code* be adopted, with local amendments as set forth in this Ordinance; and

WHEREAS, pursuant to the City Charter, Article II, Section 7, City Council may enact any ordinance which adopts a code by reference in whole or in part provided that before adoption of such ordinance the Council hold a public hearing thereon and that notice of the hearing shall be published twice in a newspaper of general circulation published in the City, with one of such publications occurring at least eight (8) days preceding the hearing and the other publication occurring at least fifteen (15) days preceding the hearing; and

WHEREAS, in compliance with City Charter, Article II, Section 7, the City Clerk published in the Fort Collins *Coloradoan* such notice of hearing concerning adoption of the 2021 International Codes on January 30, 2022, and February 6, 2022; and

WHEREAS, attached as Exhibit "A" and incorporated herein by reference is the Notice of Public Hearing dated January 24, 2022, that was so published and which the Council hereby finds meets the requirements of Article II, Section 7 of the City Charter.

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

Section 1. That the City Council hereby makes and adopts the determinations and findings contained in the recitals set forth above.

Section 2. The City Council hereby repeals the 2018 *International Energy Conservation Code* ("IECC") and hereby adopts the 2021 IECC as amended by this Ordinance.

Section 3. That Section 5-26(b) of the Code of the City of Fort Collins is hereby deleted in its entirety and all subsequent subparagraphs re-lettered accordingly.

Section 4. That Section 5-26(c) of the Code of the City of Fort Collins is hereby amended to read as follows:

(b) Pursuant to the power and authority conferred on the City Council by C.R.S. § 31-16-202 and Article II, Section 7 of the Charter, the City Council has adopted the *2021 International Energy Conservation 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 and which shall apply exclusively to the design and construction of all buildings that are classified as residential buildings not more than three (3) stories above grade and their systems; new portions of such existing buildings and their systems; and new systems and equipment in such existing buildings, exclusive of detached one- and two-family dwellings, multiple single-family dwellings (townhouses), for the purpose of establishing minimum requirements for minimum energy efficiency. As provided in the *2021 International Energy Conservation Code*, Appendices are not adopted except as expressly set forth in § 5-31.

Section 5. That Section 5-31 of the Code of the City of Fort Collins is hereby repealed in its entirety and reenacted to read as follows:

Sec. 5-31. Amendments and deletions to the 2021 International Energy Conservation Code.

The *2021 INTERNATIONAL ENERGY CONSERVATION CODE* adopted in § 5-26(c) is hereby amended in the following respects:

1. Section C101.1 Title is hereby retained in its entirety with the following amendments:

   C101.1 Title. This code shall be known as the *International Energy Conservation Code* of the City of Fort Collins, and shall be cited as such. It is referred to herein as "this code."

2. A new **Section C101.4.2 Energy assessment** is hereby added to read as follows:

C101.4.2 Energy assessment. Prior to any *alterations*, projects shall undergo a City of Fort Collins Utilities Facility Energy Assessment.

Exceptions: Facility energy assessments are not required in the following cases.

1. *Buildings* for which the first Certificate of Occupancy was issued after August 2017.
2. First-time interior finishes.
3. A *building* that has undergone an energy assessment within the previous three years.
4. *Alterations* to the HVAC, lighting, power, exterior walls systems, and roofing systems or replacement of such with a construction valuation of less than $50,000.
5. *Residential buildings*.

3. A new **Section C103.7 Permits** is hereby added to read as follows:

C103.7 Permits. Procedures related to permits, required inspections, payment of fees and obtaining required approvals shall be as set forth in Chapter 1 of the adopted *International Building Code*.

4. **SECTION C104 FEES** is hereby deleted in its entirety and replaced with the following:

C104.1 Fees. All items relating to fees shall be as specified in Section 109 of the adopted *International Building Code*, entitled "Fees."

5. **SECTION C110 BOARD OF APPEALS** is hereby deleted in its entirety and replaced with the following:

SECTION C110
MEANS OF APPEALS

C110.1 Means of appeals. Appeals of decisions, determinations and interpretations of this code shall be made pursuant to the applicable provisions of Section 113 of the adopted *International Building Code*, entitled "MEANS OF APPEALS."

6. A new **SECTION C111 VIOLATIONS** is hereby added to read as follows:

SECTION C111 VIOLATIONS.

C111.1 Violations. Violations of this code shall be made pursuant to the applicable provisions of Section 114 of the adopted *International Building Code* as amended.

7. **SECTION C202 GENERAL DEFINITIONS** is hereby amended to modify, or add, in alphabetical order, the following definitions:

ALL-ELECTRIC BUILDING. A *building* that has no natural gas or propane plumbing installed within the *building*, and that uses electricity as the sole source of

energy for its space heating and cooling, water heating (including pools and spas), cooking appliances, and clothes drying appliances. *All-electric buildings* may include solar thermal water and pool heating.

CONTINUOUS AIR BARRIER. The combination of interconnected materials, assemblies, and flexible sealed joints and components of the *building thermal envelope* that provides air tightness to a specified permeability.

ELECTRIC HEAT. An indoor environmental primary heat source that is electric. A ground-source electric heat pump or a cold climate heat pump specifically designed to heat at the Winter Outdoor, Design Dry-Bulb temp for Climate Zone 5b as determined by the DESIGN CRITERIA within this code. The heat pump system shall not be gas or propane fuel fired. Electric resistance strip heat shall serve only as emergency back-up heat or supplemental heat at outdoor temperatures below 15°F as necessary.

MIXED-FUEL BUILDING. A *building* that uses natural gas or propane as fuel for space heating and cooling, water heating (including pools and spas), cooking appliances or clothes drying appliances, or is plumbed for such equipment.

8. A new **Section C301.5 Exterior and interior local design parameters** is hereby added to read as follows:

Section C301.5 Exterior and Interior Local Design Parameters. The following thermal design parameters shall be used for mechanical load calculations and designs.

Exterior and Interior Local Design Parameters.

Winter Outdoor, Design Dry-bulb (°F)	= 6
Winter Indoor, Design Dry-bulb (°F)	= 72
Summer, Outdoor Design Dry-bulb (°F)	= 91
Summer, Indoor Design Dry-bulb (°F)	= 75
Summer, Outdoor Design Wet-bulb (°F)	= 62
Summer, Indoor Design Wet-bulb (°F)	= 62
Degree Days heating	= 6148
Degree days cooling	= 757

Fort Collins is in *Climate Zone* 5B.

9. A new **Section C401.1.1 Building Electrification** is hereby added to read as follows:

C401.1.1 Building electrification. All newly constructed *buildings* shall be constructed as an *all-electric building* or a *mixed-fuel building* that is pre-wired for future electric space heating, water heating, cooking and clothes drying equipment.

10. **Section C401.2.2 ASHRAE 90.1** is hereby amended to read as follows:

C401.2.2 ASHRAE 90.1. Commercial buildings shall comply with the requirements of ANSI/ASHRAE/IESNA 90.1, **Section C401.1.1 Building Electrification, Section**

C402.2.4 Slabs-on-grade, Section C402.5 Air leakage-thermal envelope, and ***APPENDIX CB SOLAR READY ZONE-COMMERCIAL.***

11. **Section C402.1.2 Equipment buildings** is hereby retained in its entirety, except Item #3 is amended to read as follows:

. . .

3. Have a heating system capacity not greater than (17,000 Btu/h) (5 kW) and a heating thermostat setpoint that is restricted to not more than 50°F (10°C) and that have permanent signage installed at the thermostat as instruction to the thermostat setpoint limitation.

. . .

12. **TABLE C402.1.3 OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD** is hereby deleted in its entirety and replaced with the following Table:

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a]

CLIMATE ZONE 5	All other	Group R
Roofs		
Insulation entirely above roof deck	R-30ci	R-30ci
Metal buildings[b]	R-19+R-11 LS	R-19+R-11 LS
Attic and other	R-49	R-49
Walls, above grade		
Mass[f]	R13ci	R-13ci
Metal building	R-13+R-15ci	R-13+R-15ci
Metal framed	R-13+R-10ci	R-13+R-10ci
Wood framed and other	R-15+R-7.5ci or R-20+5ci[i]	R-15+R-7.5ci or R-20+5ci[i]
Walls, below grade		
Below-grade wall[d]	R-10ci	R-10ci
Floors		
Mass[e]	R-14.6ci	R-16.7ci
Floor - steel joist	R-30+7.5ci	R-30+7.5ci
Wood joist/framing	R-38	R-38
Slab-on-grade floors		
Unheated slabs[h]	R-15 for 24" below	R-20ci for 24" below
Heated slabs[g,h]	R-15 for 36" below+R-5 full slab	R-15 for 36" below+R-5 full slab
Opaque doors		

Opaque non-swinging doors	R-4.75	R-4.75

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m2, 1 pound per cubic foot = 16 kg/m3.
ci = Continuous Insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA 90.1 Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. "Mass floors" shall be in accordance with Section C402.2.3.
f. "Mass walls" shall be in accordance with Section C402.2.2.
g. The first value is for perimeter insulation and the second value is for full, under-slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
h. Vertical insulation located below grade shall be extended the distance provided in the table or to top of footing.
i. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.

13. **TABLE C402.1.4 OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a,b]** is hereby deleted in its entirety and replaced with the following Table:

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a,b]

CLIMATE ZONE 5	All other	Group R
Roofs		
Insulation entirely above roof deck	U-0.032	U-0.032
Metal buildings	U-0.035	U-0.035
Attic and other	U-0.021	U-0.021
Walls, above grade		
Mass[g]	U-0.68	U-0.068
Metal building	U-0.49	U-0.49
Metal framed	U-0.052	U-0.052
Wood framed and other[k]	U-0.046	U-0.046
Walls, below grade		
Below-grade wall[c]	U-0.092	U-0.092
Floors		
Mass[d]	U-0.057	U-0.051
Floor - steel joist	U-0.029	U-0.029
Wood joist/framing	U-0.027	U-0.027
Slab-on-grade floors		
Unheated slabs[j]	F-0.52	F-0.51
Heated slabs[f,j]	F-0.62	F-0.62
Opaque doors		
Non-swinging door	U-0.31	U-0.31
Swinging door[h]	U-0.37	U-0.37
Garage door <14% glazing[i]	U-0.31	U-0.31

For SI: 1 pound per square foot = 4.88 kg/m2, 1 pound per cubic foot = 16 kg/m3.
ci = Continuous Insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full, under-slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.
h. Swinging door *U*-factors shall be determined in accordance with NFRC-100.
i. Garage doors having a single row of fenestration shall have an assembly *U*-factor less than or equal to 0.44 in Climate Zones 0 through 6 and less than or equal to 0.36 in Climate Zones 7 and 8, provided that the fenestration area is not less than 14 percent and not more than 25 percent of the total door area.
j. Vertical insulation located below grade shall be extended the distance provided in the table or to top of footing.
k. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.

14. **Section C402.2 Specific building thermal envelope insulation requirements** is hereby amended to read as follows:

C402.2 Specific building thermal envelope insulation requirements. Insulation in *building thermal envelope* opaque assemblies shall comply with Sections C402.2.1 through C402.2.7 and Table C402.1.3. All insulation shall be installed to meet Residential Energy Services Network (RESNET) Grade I standard.

15. **Section C402.5 Air leakage-thermal envelope** is hereby amended to read as follows:

C402.5 Air leakage—thermal envelope. The *building thermal envelope* shall comply with Sections C402.5.1 through Section C402.5.11.1, and the *building thermal envelope* shall be tested in accordance with Section C402.5.2 or C402.5.3.

16. **Section C402.5.1 Air barriers** is hereby amended to read as follows:

Section C402.5.1 Air barriers. A continuous air barrier shall be provided throughout the *building thermal envelope*. The continuous air barriers shall be located on the inside or outside of the building thermal envelope, located within the assemblies composing the building thermal envelope, or any combination thereof. The air barrier boundary limits and size of the surface area (floor, wall, and ceiling or roof) of the *building* air barrier, and of the zone or zones to be tested for maximum building air infiltration and exfiltration, shall be clearly identified on the approved construction drawings. All *air barrier* components of each *building thermal envelope* assembly shall be clearly identified on construction documents and the joints, interconnections, and penetrations of the *air barrier* components shall be detailed and shall comply with Sections C402.5.1through C402.5.9.

Exception: Air barriers are not required in buildings located in *Climate Zone* 2B.

17. **Section C402.5.1.5 Building envelope performance verification** is hereby amended to read as follows:

Section C402.5.1.5 Building envelope performance verification. The installation of the continuous air barrier shall be verified by the *code official* and an *approved* air leakage testing agency in accordance with the following:

1. A review of the construction documents and other supporting data shall be conducted to assess compliance with the requirements in Section C402.5.1.
2. Inspection of continuous air barrier components and assemblies shall be conducted during construction while the air barrier is still accessible for inspection and repair to verify compliance with the requirements of Sections C402.5.1.3 and C402.5.1.4.
3. An air barrier and air sealing inspection report shall be provided for inspections completed by the *approved* air leakage testing agency. The air barrier and air sealing inspection report shall be provided to the building owner or owner's authorized agent and the *code official* at the time of framing and insulation inspection. The report shall identify deficiencies found during the review of the construction documents and inspection and details of corrective measures taken.

18. **Section C402.5.2 Dwelling and sleeping unit enclosure testing** is hereby deleted in its entirety and replaced with the following:

C402.5.2 Dwelling and sleeping unit enclosure testing. The *building thermal envelope* shall be tested in accordance with ASTM E779, ANSI/RESNET/ICC 380, ASTM E1827 and City of Fort Collins Building Code Protocol for *New Multifamily Building Air Tightness Testing*. Documentation of the testing results shall be submitted to the *building official* prior to approval. If the *building* or *dwelling unit* fails air leakage testing, the testing agency is required to perform a diagnostic evaluation in accordance with ASTM E1186. The testing agency can use additional methods to discover leaks. Repairs based on these diagnostics and retesting is required prior to submitting results to the *building official*. Where compliance is based on such testing, the *building* also shall comply with Sections C402.5.6, C402.5.7 and C402.5.8. The air barrier shall comply with Sections C402.5.1.1, and C402.5.1.2. The measured air leakage shall not exceed 0.30 cfm/ft^2 (1.5 L/s m^2) of the testing unit enclosure area at a pressure differential of 0.2 inch water gauge (50 Pa). Units shall be tested separately with an unguarded blower door test as follows:

1. Where *buildings* have fewer than eight testing units, each testing unit shall be tested.

2. For *buildings* with eight or more testing units, 20 percent of the testing units in the *building* shall be tested, including at least one of each unit type and approximately an equal number of units on each floor level. For each tested unit that exceeds the maximum air leakage rate, corrections to the unit must be made and the unit re-tested until it meets the required air leakage, and an additional two units of this type in the same *building* shall be tested and meet the required air leakage.

19. **Section C402.5.3 Building thermal envelope testing** is hereby deleted in its entirety and replaced with the following:

C402.5.3 Building thermal envelope testing. The *building thermal envelope* shall be tested in accordance with ASTM E779, ANSI/RESNET/ICC 380, ASTM E3158 or ASTM E1827 or in accordance with the most current version of the City of Fort Collins Building Air Leakage Test Protocol for *commercial buildings*. Documentation of the testing results shall be submitted to the *building official* prior to approval. If the *building* fails air leakage testing, the testing agency is required to perform a diagnostic evaluation in accordance with ASTM E1186. The testing agency can use additional methods to discover leaks. Repairs based on these diagnostics and retesting is required prior to submitting results to the *building official*. Where compliance is based on such testing, the *building* shall also comply with Sections C402.5.7, C402.5.8 and C402.5.8. The air barrier shall comply with Sections C402.5.1.1, and C402.5.1.2. The measured air leakage shall not exceed 0.25 cfm/ft^2 (2.0 L/s $\times$ m^2) of the *building thermal envelope* area at a pressure differential of 0.3 inch water gauge (75 Pa).

20. **Section C402.5.6 Doors and access openings to shafts, chutes, stairways and elevator lobbies** is hereby amended to read as follows:

C402.5.6 Doors and access openings to shafts, chutes, stairways and elevator lobbies. Doors and *access* openings from conditioned space to shafts, chutes, stairways and elevator lobbies not within the scope of the fenestration assemblies covered by Section C402.5.4 shall be gasketed, weather-stripped or sealed. Doors and access openings on vertical walls from conditioned space to unconditioned attic space shall be insulated to a minimum of R-7.

Exceptions:

1. Door openings required to comply with Section 716 of the *International Building Code.*
2. Doors and door openings required to comply with UL 1784 by the *International Building Code.*

21. A new **Section C403.1.3 Heating electrification** is added to read as follows:

C403.1.3 Heating electrification. Space conditioning equipment shall meet the requirements for an *all-electric building or mixed-fuel building* within Section C401.1.1.

22. **Section C403.12.3.1 Protection of piping insulation** is hereby amended to read as follows:

C403.12.3.1 Protection of piping insulation. Piping insulation exposed to the weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance and wind, and shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape and paint products and similar applications that require maintenance shall not be permitted.

23. A new **Section C404.1.1 Water heating electrification** is added to read as follows:

Section C404.1.1 Water heating electrification. Service water-heating equipment shall meet the requirements for an *all-electric building* or *mixed-fuel building* within Section C401.1.1.

24. **Section C405.2.5 Specific application controls** is hereby retained in its entirety, except Item #2 is amended to read as follows:

...

2. *Sleeping units* shall have control devices or systems that are configured to automatically switch off all permanently installed luminaires, switched receptacles, televisions, and the heating, ventilating and air conditioning system set point raised at least 5 degrees Fahrenheit (3 degrees centigrade) in the cooling mode and lowered at least 5 degrees Fahrenheit (3 degrees centigrade) in the heating mode whenever the guest room is unoccupied. All permanently wired luminaires located in bathrooms within sleeping units in hotels, motels, boarding houses or similar *buildings* shall be equipped with occupant sensors that require manual intervention to energize circuits.

Exceptions:

1. Lighting and switched receptacles controlled by card key controls.
2. Spaces where patient care is directly provided.
3. Existing *buildings* undergoing an occupancy change to R-1 and that have 8 or less sleeping units.

...

25. **Section C405.2.7.1 Daylight shutoff** is hereby amended to read as follows:

C405.2.7.1 Daylight shutoff. Lights shall be automatically turned off when daylight is present or within 30 minutes after sunrise.

26. **Section 405.2.7.3 Lighting setback** is hereby amended to read as follows:

C405.2.7.3 Lighting setback. Lighting that is not controlled in accordance with Section C405.2.7.2 shall comply with the following:

1. Be controlled so that the total wattage of such lighting is automatically reduced by not less than 50 percent by selectively switching off or dimming luminaires at one of the following times:

1.1 From not later than one hour after business closing to not earlier than one hour before business opening.

1.2 During any time where activity has not been detected for 15 minutes or more.

2. Luminaires serving outdoor parking areas shall be controlled so that the total wattage of such lighting is automatically reduced by not less than 50 percent

during any time where activity has not been detected for 15 minutes or more. Not more than 1,500 watts of lighting power shall be controlled together.

27. **Section C405.2.8 Parking garage lighting control** is hereby retained in its entirety, except Item #1 is amended to read as follows:

. . .

1. Lighting power of each luminaire shall be automatically reduced by not less than 50 percent when there is no activity detected within a lighting zone for 15 minutes.

. . .

28. **Section C405.12 Energy monitoring** is hereby amended to read as follows:

C405.12 Energy monitoring. New buildings with greater than or equal to 600 amp electric service shall be equipped to measure, monitor, record and report energy consumption data in compliance with Sections 405.12.1 through C405.12.5.

Exception: R-2 occupancies and individual tenant spaces are not required to comply with this section provided that the space has its own utility services and meters and has less than 5,000 square feet (464.5 m2) of *conditioned floor area*.

29. A new **Section C405.13 Cooking and clothes drying electrification** is hereby added to read as follows:

C405.13 Cooking and clothes drying electrification. Clothes drying and cooking equipment shall meet the requirements for an *all-electric building* or *mixed-fuel building* within Section C401.1.1.

30. **TABLE C406.1(2) ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP R AND I OCCUPANCIES** is hereby retained in its entirety, except Sections C406.7.3 and C406.7.4 in Climate Zone 5B only are amended to read as follows:

TABLE C406.1(2)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP R AND I OCCUPANCIES

SECTION	CLIMATE ZONE
	5B
C406.7.3: Efficient fossil fuel water heater[b]	5
C406.7.4: Heat pump water heater[b]	9

31. **TABLE C406.1(5) ADDITIONAL ENERGY EFFICIENCY CREDITS FOR OTHER OCCUPANCIES** is hereby retained in its entirety, except Sections C406.7.3 and C406.7.4 in Climate Zone 5B only are amended to read as follows:

TABLE C406.1(5)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR OTHER[a] OCCUPANCIES

SECTION	CLIMATE ZONE
	5B
C406.7.3: Efficient fossil fuel water heater[b]	5
C406.7.4: Heat pump water heater[b]	9

32. **Section C406.9 Reduced air infiltration** is hereby amended to read as follows:

C406.9 Reduced air infiltration. Air infiltration shall be verified by testing conducted in accordance with ASTM E779 or ASTM E1827 by an independent third party. The measured air-leakage rate of the building envelope shall not exceed 0.19 cfm/ft^2 (2.0 L/s × m^2) under a pressure differential of 0.3 inches water column (75 Pa), with the calculated surface area being the sum of the above- and below-grade building envelope. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the code official and the building owner.

Exception: For buildings having over 250,000 square feet (25 000 m2) of *conditioned floor area*, air leakage testing need not be conducted on the whole building where testing is conducted on representative above-grade sections of the building. Tested areas shall total not less than 25 percent of the conditioned floor area and shall be tested in accordance with this section.

33. **TABLE C407.2 REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE** is hereby retained in its entirety and amended only to add Sections C402.2.4 and C401.1.1 under "Envelope":

TABLE C407.2
REQUIREMENTS FOR TOTAL BUILDNG PERFORMANCE

SECTION	TITLE
Envelope	
C402.2.4	Slabs-on-grade
C401.1.1	Building electrification

34. **Section C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements** is hereby amended to read as follows:

C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements. Prior to the final mechanical and plumbing inspections, the *registered design professional or approved agency* shall provide evidence of mechanical systems *commissioning* and completion in accordance with the provisions of this section.

Construction document notes shall clearly indicate provisions for *commissioning* and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner's authorized agent and made available to the *code official* upon request in accordance with Sections C408.2.4 and C408.2.5.

Exceptions: The following systems are exempt:

1. Mechanical systems and service water-heating systems in buildings where the gross conditioned floor area is 15,000 square feet or less.
2. Systems included in Section C403.5 that serve individual *dwelling units* and *sleeping units*.

35. **Section C408.2.5.2 Final commissioning report** is hereby amended to read as follows:

C408.2.5.2 Final commissioning report. A report of test procedures and results identified as "Final Commissioning Report" shall be delivered to the building owner or owner's authorized agent and shall be made available to the *code official* upon request. The report shall be organized with mechanical system and service hot water system findings in separate sections to allow independent review. The report shall include the following:

1. Results of functional performance tests.
2. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.
3. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

Exception: Deferred tests that cannot be performed at the time of report preparation due to climatic conditions.

36. A new **SECTION C409 INTEGRATED DESIGN ASSISTANCE** is hereby added to read as follows:

C409 INTEGRATED DESIGN ASSISTANCE

C409.1 Scope. This section establishes criteria for compliance using ASHRAE 90.1 Appendix G Performance Rating Method in accordance with the City of Fort Collins Integrated Design Assistance Program referred to herein as "IDAP".

C409.2 Requirements for Integrated Design Assistance. Participation in this compliance path requires:

1. The project must be an active participant in IDAP.
2. The project has qualified for the Design Incentive.

C409.3 Documentation. The documentation required for compliance is the energy report based on the submitted CD drawing package and approved by the IDAP program manager.

C409.3.1 Compliance report. Permit submittals shall include the energy report documenting that the proposed design has annual energy costs less than or equal to the

annual energy costs of the baseline building adjusted to current code and in accordance with IDAP. The report shall include the following information:

1. Address of the *building*.
2. An inspection checklist documenting the building component characteristics of the *proposed design*. The inspection checklist shall show the estimated annual energy cost for both the baseline building adjusted to current code and the *proposed design*.
3. Name of individual completing the compliance report.
4. Name and version of the compliance software tool.

C409.3.2 Additional documentation. The *code official* may also require the following production of documentation of the building component characteristics of the Baseline Building including the code Building Performance Factor and proposed Building Performance Factor.

37. **Section C501.2 Compliance** is hereby amended to read as follows:

C501.2 Compliance. *Additions*, *alterations*, *repairs*, and changes of occupancy to, or relocation of, existing *buildings* and structures shall comply with Sections C502, C503, C504 and C505 of this code, as applicable, and with the provisions for *alterations*, *repairs*, *additions* and changes of occupancy or relocation, respectively, in the *International Building Code*, *International Existing Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code*, to the extent adopted by the *Colorado Plumbing Code, International Property Maintenance Code* and NFPA 70, as adopted by the City. Changes where unconditioned space is changed to conditioned space shall comply with Section C502.

Exceptions:

1. *Additions*, *alterations*, *repairs* or changes of occupancy complying with ANSI/ASHRAE/IESNA 90.1.
2. *Additions*, *alterations*, *repairs* or changes of occupancy do not need to comply with the requirements of C402.2.4 Slab-on-grade floors when it would require the demolition of existing permanent building construction components.

38. **APPENDIX CB SOLAR READY ZONE--COMMERCIAL** is hereby adopted in its entirety.

39. **Section R103.2 Information on construction documents** is hereby retained in its entirety, and amended by the additional of a new Item #10 to read as follows:

R103.2 Information on construction documents.

. . .

10. Glazing area square footage as a percentage of individual wall area by specific elevation.

40. A new **Section R103.6 Permits** is hereby added to read as follows:

R103.6 Permits. Procedures related to permits, required inspections, payment of fees and obtaining required approvals shall be as set forth in Chapter 1 of the adopted *International Building Code.*

41. **SECTION R104 FEES** is deleted in its entirety and replaced with the following:

SECTION R104
FEES

All items relating to fees shall be as specified in Section 109 of the adopted *International Building Code*, entitled "Fees."

42. **SECTION R110 MEANS OF APPEALS** is hereby deleted in its entirety and replaced as follows:

SECTION R110
MEANS OF APPEALS

Appeals of decisions, determinations and interpretations of this code shall be made pursuant to the applicable provisions of Section 113 of the adopted *International Building Code*, entitled "MEANS OF APPEALS."

43. A new **SECTION R111 VIOLATIONS** is hereby added to read as follows:

SECTION R111 VIOLATIONS. Violations of this code shall be made pursuant to the applicable provisions of Section 114 of the adopted *International Building Code* as amended.

44. A new **TABLE R402.1 GENERAL PRESCRIPTIVE COMPLIANCE REQUIREMENTS** is hereby added to read as follows:

TABLE R402.1 GENERAL PRESCRIPTIVE COMPLIANCE REQUIREMENTS

SECTION	TITLE		
Building Thermal Envelope			
R402.2.9	Slab-on-grade floors		
R402.5	Maximum fenestration U-Factor and SHGC		
Mechanical			
TABLE R405.4.2(1) Service water heating	*HWDS* = factor for the compactness of the hot water distribution system.		
	Compactness ratio[a] factor[b]		**HWDS**
	1 story	2 or more stories	
	≤ 60% or ≤ 70% stacked Multi-Family units	≤ 30%	0.05
Electrical Power and Lighting Systems			
R404.5	Electric readiness		

a) The factor for the compactness of the hot water distribution system is the ratio of the area of the rectangle that bounds the source

of hot water and the fixtures that it serves (the "hot water rectangle") divided by the floor area of the dwelling.

1. Sources of hot water include water heaters, or in multifamily *buildings* with central water heating systems, circulation loops or electric heat traced pipes.
2. The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.
3. The hot water rectangle shall be shown on the floor plans and the areas shall be computed to the nearest square foot.
4. Where there is more than one water heater, and each water heater serves different plumbing fixtures and appliances it is permissible to establish a separate hot water rectangle for each hot water distribution system and add the area of these rectangles together to determine the compactness ratio.
5. The basement or attic shall be counted as a story when it contains the water heater.
6. Compliance shall be demonstrated by providing a drawing on the plans that shows the hot water distribution system rectangle(s), comparing the area of the rectangle(s) to the area of the dwelling and identifying the appropriate compactness ratio and *HWDS* factor.

b) Failure to meet compliance with the Compactness ratio factor shall require a hot water distribution loop with a demand button or recirculation pump with a timer or installation of electric air source heat pump water heater.

45. **TABLE R402.1.2 MAXIMUM ASSEMBLY *U*-FACTORS[A] AND FENESTRATION REQUIREMENTS** is hereby deleted in its entirety and replaced with the following:

TABLE R402.1.2
MAXIMUM ASSEMBLY *U*-FACTORS[a] AND FENESTRATION REQUIREMENTS

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT *U-FACTOR*	GLAZED FENESTRATION SHGC[d]	CEILING *U-FACTOR*	WOOD FRAME WALL *U-FACTOR*[e]	MASS WALL *U-FACTOR*[b]	FLOOR *U-FACTOR*	*BASEMENT* WALL *U-FACTOR*	CRAWL SPACE WALL U-FACTOR
5	0.28/0.25[f]	0.55	0.35	0.024	0.045	0.082	0.028	0.050	0.050

For SI: 1 foot = 304.8mm

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
b. Mass walls shall be in accordance with Section R402.2.5. Where more than half the insulation is on the interior, the mass wall *U*-factors shall not exceed 0.17 in Climate Zones 0 and 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.
c. In Warm Humid locations as defined by Figure R301.1 and Table R301.1, the basement wall *U*-factor shall not exceed 0.360.
d. The SHGC column applies to all glazed fenestration.
e. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.
f. Where the proposed glazing area is more than 30% of the wall area by elevation, as provided per section **R103.2 Information on construction documents**, the second U-factor shall be required.

46. **TABLE R402.1.3 INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT** is hereby deleted in its entirety and replaced with the following:

TABLE R402.1.3
INSULATION MINIMUM *R*-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT *U-FACTOR*[b]	GLAZED FENESTRATION SHGC[b]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE[g]	MASS WALL *R*-VALUE[f]	FLOOR *R*-VALUE	*BASEMENT*[c,e] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c,e] WALL *R*-VALUE
5	0.28/0.25[h]	0.55	0.35	60	30 or 20+5ci or 13+10ci or 0+20ci or 23 +3ci	13/17	38	15ci or 19 or 13 + 5ci	10ci, 4 ft	15ci or 19 or 13 + 5ci

For SI: 1 foot = 304.8 mm.
ci = continuous insulation

a. *R*-values are minimums. *U*-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall be not less than the *R*-value specified in the table.
b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
c. "5ci or 13" means R-5 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "10ci or 13" means R-10 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "15ci or 19 or 13 + 5ci" means R-15 continuous insulation (ci) on the interior or exterior

surface of the wall; or R-19 cavity insulation on the interior side of the wall; or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insulation on the interior or exterior surface of the wall.

d. R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation *R*-value for slabs. As indicated in the table. The slab-edge insulation for heated slabs shall not be required to extend below the slab. Insulation located below grade shall be extended the distance provided in the table or to top of footing.

e. The first value is cavity insulation; the second value is continuous insulation. Therefore, as an example, "13 + 5" means R-13 cavity insulation plus R-5 continuous insulation.

f. Mass walls shall be in accordance with Section R402.2.5. The second *R*-value applies where more than half of the insulation is on the interior of the mass wall where more than half the insulation is on the interior, the mass wall *U*-factor shall be the same as the frame wall *U*- factor.

g. Class I vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.

h. Where the proposed glazing area is more than 30% of the wall area by elevation, as provided per section **R103.2 Information on construction documents**, the second U-factor shall be required.

47. **Section R402.2 Specific insulation requirements** is hereby amended to read as follows:

R402.2 Specific insulation requirements. In addition to the requirements of Section R402.1, insulation shall meet the specific requirements of Sections R402.2.1 through R402.2.12. All insulation shall be installed to meet Residential Energy Services Network (RESNET) Grade I standard.

48. **Section R402.2.4 Access hatches and doors** is hereby amended only as to Exception #1 to read as follows:

R402.2.4 Access hatches and doors.

. . .

Exceptions:

1. Vertical entries providing access from *conditioned spaces* to unconditioned spaces that are not required to be a swinging door and shall be less than or equal to U-0.10 or have an average insulation *R*-value of R-10 or greater. If foam plastic insulation is used, it shall comply with the *International Residential Code* **Section R316.5.3 Attics**.

. . .

49. **Section R402.2.8.1 Basement wall insulation installation** is hereby amended to read as follows:

R402.2.8.1. Basement wall insulation installation. Where *basement walls* are insulated, the insulation shall be installed from the top of the *basement wall* down to the basement floor.

50. **Section R402.2.9.1 Slab-on-grade floor insulation installation** is hereby amended to read as follows:

R402.2.9.1 Slab-on-grade floor insulation installation. Where installed, the insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table R402.1.3 as applicable, by any combination of vertical insulation,

insulation extending under the slab or insulation extending out from the building. Insulation extending away from the building shall be protected by pavement or by not less than 10 inches (254 mm) of soil. The top edge of the insulation installed between the *exterior wall* and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the *exterior wall.*

51. **Section R402.2.10.1 Crawl space wall insulation installations** is hereby deleted in its entirety and replaced with the following:

R402.2.10.1 Crawl space wall insulation installations. Where crawl space wall insulation is installed, it shall be permanently fastened to the interior or exterior wall and shall extend downward from the top of foundation wall to the footing. Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the *International Building Code* or *International Residential Code*, as applicable. Joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder 6 inches (153 mm) up stem walls and footings and shall be attached and sealed to the stem walls and footing pads.

52. **TABLE R402.4.1.1 AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION**[a] is hereby amended as follows:

TABLE R402.4.1.1 AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a]

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	The *building*'s thermal envelope shall contain a continuous air barrier that is in alignment with the insulation on the conditioned and unconditioned side of the assembly.[b] All penetrations, breaks or joints in the air barrier shall be air sealed.	Air-permeable insulation shall not be used as an air sealing material. Air- permeable insulation shall be enclosed inside the air barrier assembly[b].
. . .	. . .	. . .
Walls	The junction of the foundation and the sill plate shall be sealed. The junction of the top plate and the top of walls that are adjacent to unconditioned space shall be sealed. Knee walls shall have an air barrier installed on both sides of the insulation and be sealed on all edges.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance, *R*-value, of not less than R-3 per inch. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
. . .	. . .	. . .
Rim joists	Rim joists shall include an exterior air barrier[b] The junctions of the rim board to the sill plate and the rim board and the subfloor shall be air sealed.	Rim joists shall be insulated to a minimum R-15 if spray foam or R-values indicated for Wood Frame Walls within TABLE R402.1.3 or the exterior walls minimum R-value indicated in the Proposed Design for SECTION R405 TOTAL BUILDING PERFORMANCE. The insulation shall maintain permanent contact with the exterior rim board.[h]
Floors, separating conditioned from unconditioned space, including cantilevered floors and floors above garages	The air barrier shall be installed, and air sealed at any exposed edge of the insulated floor cavity adjacent to unconditioned space.	Air permeable insulation installed in floor cavities shall be enclosed in a six-sided cavity. Floor framing cavity insulation shall be installed in accordance with the requirements of Section R402.2.7.
. . .	. . .	. . .

Shower/tub and fireplaces on exterior walls	The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.	Exterior framed walls adjacent to showers, tubs and fireplaces shall be insulated.
...	...	...
HVAC Register boots	All HVAC supply and return register boots shall be sealed to the subfloor, wall covering, or ceiling penetrated by the boot.	Insulation shall be fitted tightly around HVAC supply and return register boots located in the *building's thermal envelope to maintain its required assembly R-value.*
...	...	...

a. Inspection of log walls shall be in accordance with the provisions for ICC 400.
b. Air barrier and insulation full enclosure is not required in unconditioned/ventilated attic spaces and rim joists.

53. **Section R402.4.1.2 Testing** is hereby deleted in its entirety and replaced with the following:

R402.4.1.2 Testing. The *building* or *dwelling unit* shall be tested and verified as having an air leakage rate not exceeding three air changes per hour or 0.16 CFM per square foot of dwelling unit enclosure area. Testing shall be conducted in accordance with Section 802 of the RESNET Mortgage Industry National Home Energy Rating Standards and RESNET/ICC 380, ASTM E779 or ASTM E1827 and the City of Fort Collins Building Code Air Tightness Testing Protocol, New Attached and Detached Single Family Dwellings and reported at a pressure of 0.2 inch 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 identify the tester conducting the test, and their applicable testing certifications, and shall be provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope.*

Exception: When testing individual *dwelling units*, an air leakage rate not exceeding 0.30 cubic feet per minute per square foot [0.008 m3/(s × m2)] of the dwelling unit enclosure area, tested in accordance with ANSI/RESNET/ICC 380, ASTM E779 or ASTM E1827 and The City of Fort Collins Building Code Protocol for New Multifamily Building Air Tightness Testing and reported at a pressure of 0.2 inch w.g. (50 Pa), shall be an accepted alternative permitted in all climate zones for stacked multiple family building *dwelling units*.

54. **Section R402.4.4 Rooms containing fuel-burning appliances** is amended to read as follows:

R402.4.4 Rooms containing fuel-burning appliances In new construction, where open combustion fuel-burning appliances are installed, the appliances and combustion air opening shall be located outside the *building thermal envelope* or enclosed in a room that is isolated from inside the thermal envelope. Such rooms shall be sealed and insulated in accordance with the envelope requirements of Table R402.1.3, where the walls, floors and ceilings shall meet a minimum of the *basement wall R*-value requirement. The door into the room shall be fully gasketed and any water lines and ducts in the room insulated in accordance with Section R403. The combustion air duct shall be insulated where it passes through *conditioned space* to an *R*-value of not less than R-8.

Exceptions:

1. Direct vent appliances with both intake and exhaust pipes installed continuous to the outside.
2. Fireplaces and stoves complying with Section R402.4.2 and Section R1006 of the *International Residential Code*.

55. **Section R402.5 Maximum fenestration U-factor and SHGC** is hereby amended to read as follows:

The area-weighted average maximum fenestration *U*-factor permitted using tradeoffs from Section R402.1.5 or R405 shall be 0.32 for *vertical fenestration* and 0.75 for skylights. The area-weighted average maximum fenestration SHGC permitted using tradeoffs from Section R405 shall be 0.35.

Exception: The maximum *U*-factor and solar heat gain coefficient (SHGC) for fenestration shall not be required in storm shelters complying with ICC 500.

56. **Section R403.3.2 Ducts located in conditioned space** is hereby deleted in its entirety and replaced with the following:

R403.3.2 Ducts located in conditioned space. For ductwork to be considered as inside conditioned space, the duct system shall be located completely within the continuous air barrier and within the *building thermal envelope*.

57. **Section R403.3.6 Duct leakage** is hereby amended only as to Item #3 to read as follows:

. . .

3. Test for ducts within thermal envelope: Where all ducts and air handlers are located entirely within the *building thermal envelope*, total leakage shall be less than or equal to 4.0 cubic feet per minute (226.6 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area.*

58. **Section R403.4.1 Protection of piping insulation** is hereby amended to read as follows:

R403.4.1 Protection of piping insulation. Piping insulation exposed to weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance and wind, and shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape and paint products and similar applications that require maintenance shall be prohibited.

59. **Section R403.7 Equipment sizing and efficiency rating** is hereby amended to read as follows:

R403.7 Equipment sizing and efficiency rating. Heating and cooling *equipment* shall be designed and sized in accordance with *International Residential Code* Section

M1401.3 and performance will be verified in accordance with *International Residential Code* Section M1309.

60. A new **Section R404.4 Occupant sensor controls** is hereby added to read as follows:

R404.4 Occupant sensor controls. In multifamily *buildings*, *occupant sensor controls* shall be provided to automatically reduce connected lighting power by not less than 50 percent during periods when no occupants are present in common corridors and common enclosed stairwells.

Lighting in *means of egress* shall comply with the luminance or uniformity criteria required by the *International Building Code* when occupied.

Exception: *Automatic* power reduction shall not be used to control battery back-up emergency lighting and exit signage.

61. A new **Section R404.5 Electric readiness** is added to read as follows:

R404.5 Electric readiness. Water heating, space heating, conventional cooking equipment and dryers shall meet the requirements of R404.5 through 404.5.8. Unless otherwise noted herein the equipment shall comply with the National Appliance Energy Conservation Act of 1987 (NAECA).

R404.5.1 Water heating electrification. All newly constructed *residential buildings* shall be constructed with an electric heat pump water heating system or pre-wired to support an electric heat pump water heating system.

R404.5.2 Future water heating electrical requirements. *Residential buildings* using gas or propane as the fuel source for heating domestic water shall include a dedicated 125 volt, 20 amp electrical receptacle that is connected to the electric panel with a 120/240 volt 3 conductor, 12 AWG copper branch circuit within 3 feet from the water heater and accessible to the water heater with no obstructions.

Exception: Installed conduit with pull string sized to accommodate future water heating electrical requirements.

R404.5.3 Labeling. Both ends of the unused conductor shall be labeled with the word "SPARE" and be electrically isolated.

R404.5.4 Circuit. A single pole circuit breaker space shall be reserved in the electrical panel adjacent to the circuit described in Section R304.1.1 and labeled with the words "Future 240V Use."

R404.5.5 Water heating serving multiple dwelling units. Water heating systems supporting multiple dwelling units shall meet the requirements of Sections R404.5, R404.2.2, R404.2.3 and Sections C404.3 through C404.7.

R404.5.6 Space heating for electrification. Space heating equipment shall be constructed with a ground-source electric heat pump or an electric cold climate heat pump specifically designed to heat at the Winter Outdoor, Design Dry-Bulb temp defined in Section 301.5 of this code or pre-wired to support the aforementioned electric heat pump system. Electric resistance strip heat shall only serve as defrost, emergency back-up heat or supplemental heat at outdoor temperatures less than or equal to 15°F.

R404.5.7 Future heating and cooling electrical requirements. *Residential buildings* using gas or propane as the fuel source for space conditioning shall include a dedicated 208/240 volt, 30 amp or greater electrical circuit connected to the electric panel, terminating within 3 feet from the designated future location of the compressor unit and shall comply with:

1. Both ends of the conductor shall be labeled with the word "For Future Heat Pump Heat/Cooling" and electrically isolated;
2. A double pole circuit breaker in the electrical panel labeled with the words "For Future Heat Pump Heater"; and
3. Other electrical components, including conductors and receptacles supporting this section and installed in accordance with the National Electric Code.

Exceptions:

1. Where the heating load is less than or equal to 6.0 Btu/h/ft2 at design temperature, electric resistance heating shall be permitted.
2. Where the *building* is provided with a dedicated branch circuit in compliance with NEC article 440.4 based on heat pump space heating equipment sized in accordance with R403.7 and terminating within 3 feet (914 mm) of the location with no obstructions. Both ends of the branch circuit shall be labeled "For Future Heat Pump Heater."
3. Where an electrical circuit in compliance with NEC article 440.4 exists for space cooling equipment.
4. Where conduit with pull string sized to accommodate future heating electrical requirements is installed.

R404.5.8 Future electric heating and cooling requirements serving multiple dwelling units. Equipment serving more than one dwelling unit shall include all three requirements from R404.5.7. The electric capacity, determined at 240 volts per the National Electrical Code, shall include raceways and service and panel capacity for a termination point 3 feet from each gas space conditioning outlet.

62. **SECTION R405 TOTAL BUILDING PERFORMANCE** is hereby amended to read as follows:

SECTION R405 TOTAL BUILDING PERFORMANCE

R405.1 Scope. This section establishes criteria for compliance using total building

performance analysis. Such analysis shall include heating, cooling, mechanical ventilation and service water-heating energy only.

Exception: In addition to all required sections, new *buildings*, *additions*, or *alterations* where the primary heat source is electrical shall utilize a ground-source electric heat pump or a cold climate heat pump specifically designed to heat at the Winter Outdoor, Design Dry-Bulb temp defined in Section R301.5 of this code. Electric resistance strip heat shall only serve as defrost, emergency back-up heat or supplemental heat at outdoor temperatures less than or equal to 15°F.

63. **TABLE R405.2 REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE** is here by retained in its entirety, and amended only to add the information below to the Sections and Titles:

TABLE R405.2
REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE

<table>
<tr><th>SECTION</th><th colspan="3">TITLE</th></tr>
<tr><td colspan="4">. . .</td></tr>
<tr><td colspan="4">Building Thermal Performance</td></tr>
<tr><td>R402.2.9</td><td colspan="3">Slab-on-grade floors</td></tr>
<tr><td colspan="4">Mechanical</td></tr>
<tr><td rowspan="4">TABLE R405.4.2(1), Service water heating</td><td colspan="3">HWDS = factor for the compactness of the hot water distribution system.</td></tr>
<tr><td colspan="2">Compactness ratio[b] factor[c]</td><td>HWDS</td></tr>
<tr><td>1 story</td><td>2 or more stories</td><td></td></tr>
<tr><td>≤ 60%</td><td>≤ 30%</td><td>0.05</td></tr>
<tr><td colspan="4">Electrical Power and Lighting Systems</td></tr>
<tr><td>R404.5</td><td colspan="3">Electric readiness</td></tr>
</table>

. . .

b. The factor for the compactness of the hot water distribution system is the ratio of the area of the rectangle that bounds the source of hot water and the fixtures that it serves (the "hot water rectangle") divided by the floor area of the dwelling.
   1. Sources of hot water include water heaters, or in multifamily *buildings* with central water heating systems, circulation loops or electric heat traced pipes.
   2. The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.
   3. The hot water rectangle shall be shown on the floor plans and the areas shall be computed to the nearest square foot.
   4. Where there is more than one water heater, and each water heater serves different plumbing fixtures and appliances it is permissible to establish a separate hot water rectangle for each hot water distribution system and add the area of these rectangles together to determine the compactness ratio.
   5. The basement or attic shall be counted as a story when it contains the water heater.
   6. Compliance shall be demonstrated by providing a drawing on the plans that shows the hot water distribution system rectangle(s), comparing the area of the rectangle(s) to the area of the dwelling and identifying the appropriate compactness ratio and *WDS* factor.

c. Failure to meet compliance with the Compactness ratio factor shall require a hot water distribution loop with a demand button or recirculation pump with a timer or installation of electric air source heat pump water heater.

64. **Section R405.3.2.2 Compliance report for certificate of occupancy** is hereby retained in its entirety and amended only by adding Item #8 to read as follows:

. . .

8. A passing "Confirmed" energy rating report, including the Home Energy Rating Certificate with corresponding HERS score, reflecting as-built data, is

required to receive a Certificate of Occupancy for final approval of a completed home.

65. Section **R406.2 ERI compliance** is hereby amended to read as follows:

R406.2 ERI compliance. Compliance based on the Energy Rating Index (ERI) requires that the rated design meets all of the following:

1. The requirements of the sections indicated within Table R405.2.
2. Maximum ERI of Table R406.5

66. **Section R501.2 Compliance** is hereby amended to read as follows:

R501.2 Compliance. *Additions*, *alterations*, *repairs* or changes of occupancy to, or relocation of, an existing *building*, *building* system or portion thereof shall comply with Section R502, R503, R504 or R505, respectively, in this code. Changes where unconditioned space is changed to *conditioned space* shall comply with Section R502.

Exception: *Additions*, *alterations*, *repairs* or changes of occupancy do not need to comply with the requirements of R402.2.9 Slab-on-grade floors when it would require the demolition of existing permanent building construction components.

67. **Section R502.1 General** is hereby amended to read as follows:

R502.1 General. *Additions* to an existing *building*, *building* system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction. *Additions* shall not create an unsafe or hazardous condition or overload existing *building* systems.

68. **Section R502.3.1 Building envelope** is hereby amended to read as follows:

R502.3.1 Building envelope. New *building* envelope assemblies that are part of the *addition* shall comply with Sections R402.1, R402.2, R402.3.1 through R402.3.5, and R402.4.

Exceptions:

1. Where new construction roof lines for *additions* are built to match existing roof lines a minimum of uncompressed R-19 insulation extending over the wall top plate at the eaves shall be allowed.
2. Where demolition of existing permanent building construction components is required to meet the requirements of R402.2.9 Slab-on-grade floors.

69. A new **Section R502.4 Compliance** is hereby added to read as follows:

R502.4 Compliance. An *addition* shall be deemed to comply with this code where the existing *building* with the *addition* complies prescriptively (using Total UA) or does not use more energy than the existing *building* and demonstrates compliance using either Building Performance energy cost, or ERI compliance option listed

below. Existing *building* envelope and energy features shall be evaluated per ANSI/RESNET/ICC 301-2019 or ANSI/BPI 1200-S-2017 standards.

Exceptions: Unaltered portions of the existing *building* or *building* system are not required to comply with this code section if

1. The existing *building* was constructed to the 2009 *International Energy Conservation Code* or later; or
2. The *addition* is less than 30% of the total conditioned floor area of the existing *building*; or
3. The *building* has undergone a documented energy efficiency upgrades to the envelope within the last 10 years.

R502.4.1 Existing plus addition (Prescriptive compliance). Total UA compliance verification in Section R402.1.5 shall demonstrate that the existing *building* plus the *addition*, has a total UA that is less than or equal to the Total UA of the existing *building* prior to the *addition*. This method requires the project to create two Total UA compliance verification reports as outlined in Section R502.4.1.1.

R502.4.1.1 Reporting.

For permitting, the following are required:

1. A Total UA compliance benchmark report of the existing structure prior to construction.
2. A Total UA compliance report of the existing *building*, plus the *addition* based on the proposed design.

R502.4.2 Existing building plus addition compliance (Total Building Performance). Total building performance Section R405 compliance verification shall demonstrate that the existing *building* plus the *addition* uses no more energy than the existing *building* did prior to the *addition*. This method requires the project to create cost compliance verification at three stages as outlined in Section R502.4.2.2.

R502.4.2.2 Reporting.

For permitting, the following are required:

1. A baseline total building performance cost compliance report of the existing structure prior to construction.
2. Projected total building performance cost compliance report of the existing *building* plus the *addition* based on the proposed design for the *building* in its entirety.

For Certificate of Occupancy, a final confirmed total building performance cost compliance report shall be submitted prior to final inspection.

R502.4.3 Existing plus addition compliance (Energy Rating Index Alternative). An ERI score shall demonstrate that the existing *building* plus the *addition* uses no more energy than the existing *building* did prior to the *addition*. This method requires the project to obtain an ERI score at three stages as outlined in Section R502.2.3.1

R502.4.3.1 Reporting.

For permitting, the following are required:
1. For permitting: A baseline ERI of the existing structure prior to construction.
2. For Permitting: A projected ERI of the existing *building* plus the *addition* based on the proposed design for the *building* in its entirety.

For Certificate of Occupancy, a confirmed ERI report shall be submitted prior to final inspection.

70. **CHAPTER 6 REFERENCED STANDARDS** is hereby amended by adding, in alphabetical order, the following additional referenced standard:

RESNET® reference standard Grade I Insulation and Section 802 of the RESNET Mortgage Industry National Home Energy Rating Standards Referenced in Amended 2021 IECC Section C402.2 and Section R402.4.1.2.

71. **APPENDIX RB SOLAR-READY PROVISIONS--DETACHED ONE- AND TWO-FAMILY DWELLINGS AND TOWNHOUSES** is hereby adopted in its entirety.

Section 6. The City Attorney and the City Clerk are authorized to modify the formatting and to make such other amendments to this Ordinance as necessary to facilitate publication in the Fort Collins Municipal Code; provided, however, that such modifications and amendments shall not change the substance of the Code provisions.

Introduced, considered favorably on first reading, and ordered published this 15th day of February, A.D. 2022, and to be presented for final passage on the 5th day of April, A.D. 2022.

CITY OF FORT COLLINS SEAL COLORADO

Mayor

ATTEST:

City Clerk

Passed and adopted on final reading on this 5th day of April, A.D. 2022.

CITY OF FORT COLLINS SEAL COLORADO

Mayor

ATTEST:

City Clerk

EXHIBIT A

NOTICE OF PUBLIC HEARING

NOTICE is hereby given of a public hearing to be held before the Council of the City of Fort Collins, Colorado, on the 15th day of February, A.D., 2022 at 6:00 p.m., or as soon thereafter as the matter may come on for hearing, in the Council Chambers at the City Hall, 300 LaPorte Avenue, Fort Collins, Colorado for the purpose of considering the adoption of ordinances that adopt by reference the *2021 International Building Code, 2021 International Residential Code, 2021 International Energy Conservation Code, 2021 International Mechanical Code, 2021 International Fuel Gas Code, 2021 International Existing Building Code, 2021 International Swimming Pool and Spa Code, 2021 International Property Maintenance Code and the International Plumbing Code*, each promulgated by the International Code Council, and the *Colorado Plumbing Code*, together with local amendments.

Not less than one (1) copy of said Codes has been, and now is on file in the Office of the City Clerk of the City of Fort Collins and is available for public inspection.

The purpose of adopting the *International Building Code*, *International Residential Code*, *International Energy Conservation Code*, *International Mechanical Code*, *International Fuel Gas Code*, *International Existing Building Code*, *International Swimming Pool and Spa Code*, the *International Property Maintenance Code*, and the Colorado Plumbing Code, with local amendments by said ordinances is to provide for protection of public health, safety and welfare of the City and its residents.

Individuals who wish to address Council via remote public participation can do so through Zoom at **https://zoom.us/j/98241416497.** (The link and instructions are also posted at **www.fcgov.com/councilcomments.**) Individuals participating in the Zoom session should watch the meeting through that site, and not via FCTV, due to the streaming delay and possible audio interference.

The City of Fort Collins will make reasonable accommodations for access to City services, programs and activities, and will make special communication arrangements for persons with disabilities. Please call (970) 221-6515 (V/TDD: Dial 711 for Relay Colorado) for assistance.

This notice is given and published by order of the City of Fort Collins, Colorado.

Dated this 24th day of January, A.D. 2022.

City Clerk

Upon request, the City of Fort Collins will provide language access services for individuals who have limited English proficiency, or auxiliary aids and services for individuals with disabilities, to access City services, programs and activities. Contact (970) 221-6515 (V/TDD: Dial 711 for Relay Colorado) for assistance. Please provide 48 hours advance notice when possible.

A petición, la Ciudad de Fort Collins proporcionará servicios de acceso a idiomas para personas que no dominan el idioma inglés, o ayudas y servicios auxiliares para personas con discapacidad, para que puedan acceder a los servicios, programas y actividades de la Ciudad. Para asistencia, llame al 970.221.6515 (V/TDD: Marque 711 para Relay Colorado). Por favor proporcione 48 horas de aviso previo cuando sea posible.