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PREFACE

Introduction

Internationally, code officials recognize the need for a contemporary energy conservation code addressing the design of energy-efficient building envelopes and installation of energy-efficient mechanical, lighting and power systems through requirements emphasizing performance. The *International Energy Conservation Code*™, in this second edition, is designed to meet these needs through model code regulations that will result in the optimal utilization of fossil fuel and nondepletable resources throughout all communities, large and small.

This comprehensive energy conservation code establishes minimum regulations for energy-efficient buildings using prescriptive and performance-related provisions. The principles utilized in the development of this code were based on the intent to establish an energy conservation code that adequately conserves energy; does not unnecessarily increase construction costs; does not restrict the use of new materials, products or methods of construction; and does not give preferential treatment to particular industries or types or classes of materials, products or methods of construction. Additionally, the *International Energy Conservation Code* is designed to be compatible with the entire family of *International Codes* published by International Code Council (ICC).

The *International Energy Conservation Code* provides many benefits, among which is the international code development process that offers an international forum for energy professionals to discuss performance and prescriptive code requirements. This forum provides an excellent arena to debate proposed revisions. This model code also encourages international consistency in the application of provisions.

Development History

Effective December 4, 1995, CABO assigned all rights and responsibilities to the *Model Energy Code* to the ICC. The first edition of the *International Energy Conservation Code* issued in 1998 has therefore replaced the 1995 CABO *Model Energy Code*. To facilitate the transfer of responsibility, the secretariat, committee members, bylaws, appeals procedures and guidelines were simply redesignated as ICC activities without change.

In its first edition, the 1998 *International Energy Conservation Code* incorporates the provisions of the 1995 edition of the *Model Energy Code* promulgated by the Council of American Building Officials (CABO) and includes the technical content of the *Model Energy Code* as modified by approved changes from the 1995, 1996 and 1997 CABO Code Development Cycles. Note that until the publishing of the 1998 *International Energy Conservation Code*, code development activities during 1995, 1996 and 1997 were carried out under CABO Code development procedures. The *Model Energy Code* was originally developed jointly by BOCA, ICBO, the National Conference of States on Building Codes and Standards (NCSBCS), and SBCCI, under a contract funded by the United States Department of Energy (DOE).

Starting with the 2000 edition, new editions will be published at three-year intervals.

Adoption

The *International Energy Conservation Code* is available for adoption and use by jurisdictions internationally. Its use within a governmental jurisdiction is intended to be accomplished through adoption by reference in accordance with proceedings establishing the jurisdiction's laws. At the time of adoption, jurisdictions should insert the appropriate information in provisions requiring specific local information, such as the name of the adopting jurisdiction. These locations are shown in bracketed words in small capital letters in the code and in the sample adoption ordinance. The sample adoption ordinance on page v addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

Maintenance

The *International Energy Conservation Code* is kept up to date through the review of proposed changes submitted by code enforcement officials, industry representatives, design professionals and other interested parties. Proposed changes are carefully considered through an open code development process in which all interested and affected parties may participate.

The contents of this work are subject to change both through the Code Development Cycles and the governmental body that enacts the code into law. For more information regarding the code development process, contact BOCA, ICBO or SBCCI.

While the development procedure of the *International Energy Conservation Code* assures the highest degree of care, BOCA, ICBO, SBCCI, their members and those participating in the development of this code do not accept any liability resulting from compliance or noncompliance with the provisions because BOCA, ICBO and SBCCI do not have the power or authority to police or enforce compliance with the contents of this code. Only the governmental body that enacts the code into law has such authority.

Marginal Markings

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 1998 edition. Deletion indicators (➡) are provided in the margin where a paragraph or item has been deleted.

Letter Designations in Front of Section Numbers

In each code development cycle, proposed changes to this code are considered at the First Public Hearing by the International Energy Conservation Code Development Committee, whose action constitutes a recommendation to the voting membership for final action on the proposed change. Proposed changes to a code section whose number begins with a letter in brackets are considered by a different code development committee. For instance, proposed changes to code sections which have the letter [M] in front (e.g., [M] 503.3.1), are considered by the International Mechanical Code Development Committee at the First Public Hearing. Where this designation is applicable to the entire content of a main section of the code, the designation appears at the main section number and title and is not repeated at every subsection in that section.

SAMPLE ORDINANCE FOR ADOPTION OF THE *INTERNATIONAL ENERGY CONSERVATION CODE*

ORDINANCE NO. _____

An ordinance of the **[JURISDICTION]** adopting the 2000 edition of the *International Energy Conservation Code,* regulating and controlling the design, construction, quality of materials, erection, installation, alteration, repair, location, relocation, replacement, addition to, use or maintenance of the building envelope, mechanical, lighting and power systems in the **[JURISDICTION]**; providing for the issuance of permits and collection of fees therefore; repealing Ordinance No. _____ of the **[JURISDICTION]** and all other ordinances and parts of the ordinances in conflict therewith.

The **[GOVERNING BODY]** of the **[JURISDICTION]** does ordain as follows:

Section 1. That certain documents, three (3) copies of which are on file in the office of the **[JURISDICTION'S KEEPER OF RECORDS]** and the **[JURISDICTION]**, being marked and designated as the *International Energy Conservation Code,* as published by the International Code Council, be and is hereby adopted as the code of the **[JURISDICTION]** for regulating the design, construction, quality of materials, erection, installation, alteration, repair, location, relocation, replacement, addition to, use or maintenance of the building envelope, mechanical, lighting and power systems in the **[JURISDICTION]** and providing for the issuance of permits and collection of fees therefore; and each and all of the regulations, provisions, conditions and terms of such *International Energy Conservation Code,* 2000 edition, published by the International Code Council, on file in the office of the **[JURISDICTION]** are hereby referred to, adopted and made a part hereof as if fully set out in this ordinance.

Section 2. The following section is hereby revised:

Secton 101.1. Insert **[NAME OF JURISDICTION]**

Section 3. That Ordinance No. _____ of **[JURISDICTION]** entitled *(fill in here the complete title of the present energy conservation ordinance or ordinances in effect at the present time so that they will be repealed by definite mention)* and all other ordinances or parts of ordinances in conflict herewith are hereby repealed.

Section 4. That if any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The **[GOVERNING BODY]** hereby declares that it would have passed this ordinance, and each section, subsection, clause or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses and phrases be declared unconstitutional.

Section 5. That the **[JURISDICTION'S KEEPER OF RECORDS]** is hereby ordered and directed to cause this ordinance to be published. *(An additional provision may be required to direct the number of times the ordinance is to be published and to specify that it is to be in a newspaper in general circulation. Posting may also be required.)*

Section 6. That this ordinance and the rules, regulations, provisions, requirements, orders and matters established and adopted hereby shall take effect and be in full force and effect **[TIME PERIOD]** from and after the date of its final passage and adoption.

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CHAPTER 1

ADMINISTRATION AND ENFORCEMENT

SECTION 101
SCOPE AND GENERAL REQUIREMENTS

101.1 Title. This code shall be known as the *International Energy Conservation Code* of [NAME OF JURISDICTION], and shall be cited as such. It is referred to herein as "this code."

101.2 Intent. The provisions of this code shall regulate the design of building envelopes for adequate thermal resistance and low air leakage and the design and selection of mechanical, electrical, service water-heating and illumination systems and equipment which will enable effective use of energy in new building construction. It is intended that these provisions provide flexibility to permit the use of innovative approaches and techniques to achieve effective utilization of energy. This code is not intended to abridge safety, health or environmental requirements under other applicable codes or ordinances.

101.3 Compliance. Compliance with this code shall be determined in accordance with Sections 101.3.1 and 101.3.2.

101.3.1 Residential buildings. For residential buildings, a systems approach for the entire building and its energy-using subsystems which utilizes renewable sources (Chapter 4), an approach based on performance of individual components of the building envelope (Chapter 5), an approach based on performance of the total building envelope (Chapter 5), an approach based on acceptable practice for each envelope component (Chapter 5), an approach by prescriptive specification for individual components of the building envelope (Chapter 5), or an approach based on simplified, prescriptive specification (Chapter 6) where the conditions set forth in Section 101.3.1.1 or 101.3.1.2 are satisfied.

For approaches using Chapter 6, the administrative provisions of Chapter 1 shall not apply except as specifically referenced in Chapter 6.

101.3.1.1 Type A-1. When the glazing area does not exceed 15 percent of the gross area of exterior walls.

101.3.1.2 Type A-2. When the glazing area does not exceed 25 percent of the gross area of exterior walls.

101.3.2 Commercial buildings. For commercial buildings, a prescriptive, system, or energy cost budget approach (Chapter 7) or as specified by acceptable practice (Chapter 8).

101.4 Scope. This code establishes minimum prescriptive and performance-related regulations for the design of energy-efficient buildings and structures or portions thereof that provide facilities or shelter for public assembly, educational, business, mercantile, institutional, storage and residential occupancies, as well as those portions of factory and industrial occupancies designed primarily for human occupancy. This code thereby addresses the design of energy-efficient building envelopes and the selection and installation of energy-efficient mechanical, service water-heating, electrical distribution and illumination systems and equipment for the effective use of energy in these buildings and structures.

Exception: Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories high with separate means of egress and their accessory structures shall comply with the *International Residential Code*.

101.4.1 Exempt buildings. Buildings and structures indicated in Sections 101.4.1.1 and 101.4.1.2 shall be exempt from the provisions of this code. Commercial buildings provided with service water heating and/or electric lighting shall meet the applicable provisions of Chapter 7 or 8 regardless of this exempt status.

101.4.1.1 Separated buildings. Buildings and structures, or portions thereof separated by building envelope assemblies from the remainder of the building, that have a peak design rate of energy usage less than 3.4 Btu/h per square foot (10.7 W/m^2) or 1.0 watt per square foot (10.7 W/m^2) of floor area for all purposes.

101.4.1.2 Unconditioned buildings. Buildings and structures or portions thereof which are neither heated nor cooled.

101.4.2 Applicability. The provisions of this code shall apply to all matters affecting or relating to structures and premises, as set forth in Section 101. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

101.4.2.1 Existing installations. Except as otherwise provided for in this chapter, a provision in this code shall not require the removal, alteration or abandonment of, nor prevent the continued utilization and maintenance of, an existing building envelope, mechanical, service water-heating, electrical distribution or illumination system lawfully in existence at the time of the adoption of this code.

101.4.2.2 Additions, alterations or repairs. Additions, alterations, renovations or repairs to a building envelope, mechanical, service water-heating, electrical distribution or illumination system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing system to comply with all of the requirements of this code. Additions, alterations or repairs shall not cause any one of the aforementioned and existing systems to become unsafe, hazardous or overloaded.

101.4.2.3 Historic buildings. The provisions of this code relating to the construction, alteration, repair, enlargement, restoration, relocation or moving of buildings or structures shall not be mandatory for existing buildings or

structures specifically identified and classified as historically significant by the state or local jurisdiction, listed in *The National Register of Historic Places* or which have been determined to be eligible for such listing.

101.4.2.4 Change in occupancy. It shall be unlawful to make a change in the occupancy of any building or structure which would result in an increase in demand for either fossil fuel or electrical energy supply unless such building or structure is made to comply with the requirements of this code or otherwise approved by the authority having jurisdiction. The code official shall certify that such building or structure meets the intent of the provisions of law governing building construction for the proposed new occupancy and that such change of occupancy does not result in any increase in demand for either fossil fuel or electrical energy supply or any hazard to the public health, safety, or welfare.

101.4.3 Mixed occupancy. When a building houses more than one occupancy, each portion of the building shall conform to the requirements for the occupancy housed therein. Where minor accessory uses do not occupy more than 10 percent of the area of any floor of a building, the major use shall be considered the building occupancy. Buildings, other than Type A-1 Residential Buildings, with a height of four or more stories above grade shall be considered commercial buildings for purposes of this code, regardless of the number of floors that are classified as residential occupancy.

SECTION 102
MATERIALS, SYSTEMS AND EQUIPMENT

102.1 General. Materials, equipment and systems shall be identified in a manner that will allow a determination of their compliance with the applicable provisions of this code.

102.2 Materials, equipment and systems installation. All insulation materials, caulking and weatherstripping, fenestration assemblies, mechanical equipment and systems components, and water-heating equipment and system components shall be installed in accordance with the manufacturer's installation instructions.

102.3 Maintenance information. Required regular maintenance actions shall be clearly stated and incorporated on a readily accessible label. Such label shall include the title or publication number, the operation and maintenance manual for that particular model and type of product. Maintenance instructions shall be furnished for equipment that requires preventive maintenance for efficient operation.

102.4 Insulation installation. Roof/ceiling, floor, wall cavity and duct distribution systems insulation shall be installed in a manner that permits inspection of the manufacturer's *R*-value identification mark.

102.4.1 Protection of exposed foundation insulation. Insulation applied to the exterior of foundation walls and around the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective covering shall cover the exposed area of the exterior insulation and extend a minimum of 6 inches (153 mm) below grade.

102.5 Identification. Materials, equipment and systems shall be identified in accordance with Sections 102.5.1, 102.5.2 and 102.5.3.

102.5.1 Building envelope insulation. A thermal resistance (*R*) identification mark shall be applied by the manufacturer to each piece of building envelope insulation 12 inches (305 mm) or greater in width.

Alternatively, the insulation installer shall provide a signed and dated certification for the insulation installed in each element of the building envelope, listing the type of insulation installations in roof/ceilings, the manufacturer and the *R*-value. For blown-in or sprayed insulation, the installer shall also provide the initial installed thickness, the settled thickness, the coverage area and the number of bags installed. Where blown-in or sprayed insulation is installed in walls, floors and cathedral ceilings, the installer shall provide a certification of the installed density and *R*-value. The installer shall post the certification in a conspicuous place on the job site.

102.5.1.1 Roof/ceiling insulation. The thickness of roof/ceiling insulation that is either blown in or sprayed shall be identified by thickness markers that are labeled in inches or millimeters installed at least one for every 300 square feet (28 m^2) throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness and minimum settled thickness with numbers a minimum of 1 inch (25 mm) in height. Each marker shall face the attic access. The thickness of installed insulation shall meet or exceed the minimum initial installed thickness shown by the marker.

102.5.2 Fenestration product rating, certification and labeling. *U*-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Where a shading coefficient for a fenestration product is used, it shall be determined by converting the product's SHGC, as determined in accordance with NFRC 200, to a shading coefficient, by dividing the SHGC by 0.87. Such certified and labeled *U*-factors and SHGCs shall be accepted for purposes of determining compliance with the building envelope requirements of this code.

When a manufacturer has not determined product *U*-factor in accordance with NFRC 100 for a particular product line, compliance with the building envelope requirements of this code shall be determined by assigning such products a

default *U*-factor in accordance with Tables 102.5.2(1) and 102.5.2(2). When a SHGC or shading coefficient is used for code compliance and a manufacturer has not determined product SHGC in accordance with NFRC 200 for a particular product line, compliance with the building envelope requirements of this code shall be determined by assigning such products a default SHGC in accordance with Table 102.5.2(3). Product features must be verifiable for the product to qualify for the default value associated with those features. Where the existence of a particular feature cannot be determined with reasonable certainty, the product shall not receive credit for that feature. Where a composite of materials from two different product types is used, the product shall be assigned the higher *U*-factor.

102.5.3 Duct distribution systems insulation. A thermal resistance (*R*) identification mark shall be applied by the manufacturer in maximum intervals of no greater than 10 feet (3048 mm) to insulated flexible duct products showing the thermal performance *R*-value for the duct insulation itself (excluding air films, vapor retarders, or other duct components).

TABLE 102.5.2(1)
***U*-FACTOR DEFAULT TABLE FOR WINDOWS, GLAZED DOORS AND SKYLIGHTS**

FRAME MATERIAL AND PRODUCT TYPE[a]	SINGLE GLAZED	DOUBLE GLAZED
Metal without thermal break		
Operable (including sliding and swinging glass doors)	1.27	0.87
Fixed	1.13	0.69
Garden window	2.60	1.81
Curtain wall	1.22	0.79
Skylight	1.98	1.31
Site-assembled sloped/overhead glazing	1.36	0.82
Metal with thermal break		
Operable (including sliding and swinging glass doors)	1.08	0.65
Fixed	1.07	0.63
Curtain wall	1.11	0.68
Skylight	1.89	1.11
Site-assembled sloped/overhead glazing	1.25	0.70
Reinforced vinyl/metal clad wood		
Operable (including sliding and swinging glass doors)	0.90	0.57
Fixed	0.98	0.56
Skylight	1.75	1.05
Wood/vinyl/fiberglass		
Operable (including sliding and swinging glass doors)	0.89	0.55
Fixed	0.98	0.56
Garden window	2.31	1.61
Skylight	1.47	0.84

a. Glass block assemblies with mortar but without reinforcing or framing shall have a *U*-factor of 0.60.

TABLE 102.5.2(2)
***U*-FACTOR DEFAULT TABLE FOR NONGLAZED DOORS**

DOOR TYPE	WITH FOAM CORE	WITHOUT FOAM CORE
Steel doors (1.75 inches thick)	0.35	0.60
	WITHOUT STORM DOOR	**WITH STORM DOOR**
Wood doors (1.75 inches thick)		
Panel with 0.438-inch panels	0.54	0.36
Hollow core flush	0.46	0.32
Panel with 1.125-inch panels	0.39	0.28
Solid core flush	0.40	0.26

For SI: 1 inch = 25.4 mm.

SECTION 103
ALTERNATE MATERIALS—METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

103.1 General. The provisions of this code are not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been approved by the code official as meeting the intent of the code.

Compliance with specific provisions of this code shall be determined through the use of computer software, worksheets, compliance manuals and other similar materials when they have been approved by the code official as meeting the intent of this code.

SECTION 104
CONSTRUCTION DOCUMENTS

104.1 General. Construction documents and other supporting data shall be submitted in one or more sets with each application for a permit. The construction documents and designs submitted under the provisions of Chapter 4 shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the code official is authorized to require additional construction documents to be prepared by a registered design professional.

Exceptions:

1. The code official is authorized to waive the submission of construction documents and other supporting data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that reviewing of construction documents is not necessary to obtain compliance with this code.
2. For residential buildings having a conditioned floor area of 5,000 square feet (465 m^2) or less, designs submitted under the provisions of Chapter 4 shall be prepared by anyone having qualifications acceptable to the code official.

TABLE 102.5.2(3)
SHGC DEFAULT TABLE FOR FENESTRATION

PRODUCT DESCRIPTION	SINGLE GLAZED				DOUBLE GLAZED			
	Clear	Bronze	Green	Gray	Clear + Clear	Bronze + Clear	Green + Clear	Gray + Clear
Metal frames								
Operable	0.75	0.64	0.62	0.61	0.66	0.55	0.53	0.52
Fixed	0.78	0.67	0.65	0.64	0.68	0.57	0.55	0.54
Nonmetal frames								
Operable	0.63	0.54	0.53	0.52	0.55	0.46	0.45	0.44
Fixed	0.75	0.64	0.62	0.61	0.66	0.54	0.53	0.52

104.2 Information on construction documents. Construction documents shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted when approved by the code official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in sufficient detail pertinent data and features of the building and the equipment and systems as herein governed, including, but not limited to, design criteria, exterior envelope component materials, *U*-factors of the envelope systems, *U*-factors of fenestration products, *R*-values of insulating materials, size and type of apparatus and equipment, equipment and systems controls and other pertinent data to indicate conformance with the requirements of this code and relevant laws, ordinances, rules and regulations, as determined by the code official.

SECTION 105
INSPECTIONS

105.1 General. Construction or work for which a permit is required shall be subject to inspection by the code official.

105.2 Approvals required. No work shall be done on any part of the building or structure beyond the point indicated in each successive inspection without first obtaining the written approval of the code official. No construction shall be concealed without inspection approval.

105.3 Final inspection. There shall be a final inspection and approval for buildings when completed and ready for occupancy.

105.4 Reinspection. A structure shall be reinspected when determined necessary by the code official.

SECTION 106
VALIDITY

106.1 General. If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

SECTION 107
REFERENCED STANDARDS

107.1 General. The standards, and portions thereof, which are referred to in this code and listed in Chapter 9, shall be considered part of the requirements of this code to the extent of such reference.

107.2 Conflicting requirements. When a section of this code and a section of a referenced standard from Chapter 9 specify different materials, methods of construction or other requirements, the provisions of this code shall apply.

CHAPTER 2

DEFINITIONS

SECTION 201
GENERAL

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings indicated in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *International Building Code*, ICC *Electrical Code*, *International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code* or the *International Plumbing Code*, such terms shall have meanings ascribed to them as in those codes.

201.4 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.

SECTION 202
GENERAL DEFINITIONS

ACCESSIBLE (AS APPLIED TO EQUIPMENT). Admitting close approach because not guarded by locked doors, elevation or other effective means (see "Readily accessible").

ADDITION. An extension or increase in the height, conditioned floor area or conditioned volume of a building or structure.

ALTERATION. Any construction, renovation or change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.

AIR TRANSPORT FACTOR. The ratio of the rate of useful sensible heat removal from the conditioned space to the energy input to the supply and return fan motor(s), expressed in consistent units and under the designated operating conditions.

ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE). The ratio of annual output energy to annual input energy which includes any nonheating season pilot input loss, and for gas or oil-fired furnaces or boilers, does not include electrical energy.

APPROVED. Approved by the code official or other authority having jurisdiction as the result of investigation and tests conducted by said official or authority, or by reason of accepted principles or tests by nationally recognized organizations.

AUTOMATIC. Self-acting, operating by its own mechanism when actuated by some impersonal influence, as, for example, a change in current strength, pressure, temperature or mechanical configuration (see "Manual").

BASEMENT WALL. The opaque portion of a wall which encloses one side of a basement and having an average below-grade area greater than or equal to 50 percent of its total wall area, including openings (see "Gross area of exterior walls").

BTU. Abbreviation for British thermal unit, which is the quantity of heat required to raise the temperature of 1 pound (0.454 kg) of water 1°F (0.56°C), (1 Btu = 1,055 J).

BUILDING. Any structure occupied or intended for supporting or sheltering any use or occupancy.

BUILDING ENVELOPE. The elements of a building which enclose conditioned spaces through which thermal energy is capable of being transferred to or from the exterior or to or from spaces exempted by the provisions of Section 101.4.1

CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

COEFFICIENT OF PERFORMANCE (COP)—COOLING. The ratio of the rate of heat removal to the rate of energy input in consistent units, for a complete cooling system or factory-assembled equipment, as tested under a nationally recognized standard or designated operating conditions.

COEFFICIENT OF PERFORMANCE (COP)—HEAT PUMP—HEATING. The ratio of the rate of heat delivered to the rate of energy input, in consistent units, for a complete heat pump system under designated operating conditions. Supplemental heat shall not be considered when checking compliance with the heat pump equipment (COPs listed in the tables in Sections 503 and 803).

COMFORT ENVELOPE. The area on a psychrometric chart enclosing all those conditions described in Figure 2 in ASHRAE 55 as being comfortable.

COMMERCIAL BUILDING. All buildings over three stories in height above grade or buildings, other than residential buildings, that are three stories or less in height above grade.

CONDENSER. A heat exchanger designed to liquefy refrigerant vapor by removal of heat.

CONDENSING UNIT. A specific refrigerating machine combination for a given refrigerant, consisting of one or more power-driven compressors, condensers, liquid receivers (when required), and the regularly furnished accessories.

CONDITIONED FLOOR AREA. The horizontal projection of that portion of interior space which is contained within exterior walls and which is conditioned directly or indirectly by an energy-using system.

CONDITIONED SPACE. A heated or cooled space, or both, within a building and, where required, provided with humidification or dehumidification means so as to be capable of maintaining a space condition falling within the comfort envelope set forth in ASHRAE 55.

COOLED SPACE. Space within a building which is provided with a positive cooling supply (see "Positive cooling supply").

CRAWL SPACE WALL. The opaque portion of a wall which encloses a crawl space and is partially or totally below grade.

DEADBAND. The temperature range in which no heating or cooling is used.

DEGREE DAY, COOLING. A unit, based on temperature difference and time, used in estimating cooling energy consumption and specifying nominal cooling load of a building in summer. For any one day, when the mean temperature is more than 65°F (18°C), there are as many degree days as there are degrees Fahrenheit (Celsius) difference in temperature between the mean temperature for the day and 65°F (18°C). Annual cooling degree days (CDD) are the sum of the degree days over a calendar year.

DEGREE DAY, HEATING. A unit, based upon temperature difference and time, used in estimating heating energy consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F (18°C), there are as many degree days as there are degrees Fahrenheit (Celsius) difference in temperature between the mean temperature for the day and 65°F (18°C). Annual heating degree days (HDD) are the sum of the degree days over a calendar year.

DUCT. A tube or conduit utilized for conveying air. The air passages of self-contained systems are not to be construed as air ducts.

DUCT SYSTEM. A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances.

DWELLING UNIT. A single housekeeping unit comprised of one or more rooms providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

ECONOMIZER. A ducting arrangement and automatic control system that allows a cooling supply fan system to supply outdoor air to reduce or eliminate the need for mechanical refrigeration during mild or cold weather.

ENERGY. The capacity for doing work taking a number of forms which is capable of being transformed from one into another, such as thermal (heat), mechanical (work), electrical and chemical in customary units, measured in joules (J) kilowatt-hours (kW × h) or British thermal units (Btu).

ENERGY ANALYSIS. A method for determining the annual (8,760 hours) energy use of the Proposed design and Standard design based on hour-by-hour estimates of energy use.

ENERGY COST. The total estimated annual cost for purchased energy for the building, including any demand charges, fuel adjustment factors and delivery charges applicable to the building.

ENERGY EFFICIENCY RATIO (EER). The ratio of net equipment cooling capacity in Btu/h (W) to total rate of electric input in watts under designated operating conditions. When consistent units are used, this ratio becomes equal to COP (see also "Coefficient of performance").

EVAPORATOR. That part of the system in which liquid refrigerant is vaporized to produce refrigeration.

EXTERIOR ENVELOPE. See "Building envelope."

EXTERIOR WALL. An above-grade wall enclosing conditioned space. Includes between floor spandrels, peripheral edges of floors, roof and basement knee walls, dormer walls, gable end walls, walls enclosing a mansard roof, and basement walls with an average below grade-wall area which is less than 50 percent of the total opaque and nonopaque area of that enclosing side.

FENESTRATION. Skylights, roof windows, vertical windows (whether fixed or moveable), opaque doors, glazed doors, glass block, and combination opaque/glazed doors.

FURNACE, DUCT. A furnace normally installed in distribution ducts of air-conditioning systems to supply warm air for heating and which depends on a blower not furnished as part of the duct furnace for air circulation.

FURNACE, WARM AIR. A self-contained, indirect-fired or electrically heated furnace that supplies heated air through ducts to spaces that require it.

GLAZING AREA. Total area of the glazed fenestration measured using the rough opening and including sash, curbing or other framing elements that enclose conditioned space. Glazing area includes the area of glazed fenestration assemblies in walls bounding conditioned basements. For doors where the daylight opening area is less than 50 percent of the door area, the glazing area is the daylight opening area. For all other doors, the glazing area is the rough opening area for the door including the door and the frame.

GROSS AREA OF EXTERIOR WALLS. The normal projection of all exterior walls, including the area of all windows and doors installed therein (see "Exterior wall").

GROSS FLOOR AREA. The sum of the areas of several floors of the building, including basements, cellars, mezzanine and intermediate floored tiers and penthouses of headroom height, measured from the exterior faces of exterior walls or from the centerline of walls separating buildings, but excluding:

1. Covered walkways, open roofed-over areas, porches and similar spaces.
2. Pipe trenches, exterior terraces or steps, chimneys, roof overhangs and similar features.

HEAT. The form of energy that is transferred by virtue of a temperature difference or a change in state of a material.

HEAT CAPACITY (HC). The amount of heat necessary to raise the temperature of a given mass by one degree. The heat capacity of a building element is the sum of the heat capacities of each of its components.

HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

HEAT TRAP. An arrangement of piping and fittings, such as elbows, or a commercially available heat trap, that prevents thermosyphoning of hot water during standby periods.

HEATED SLAB. Slab-on-grade construction in which the heating elements or hot air distribution system is in contact with or placed within the slab or the subgrade.

HEATED SPACE. Space within a building which is provided with a positive heat supply (see "Positive heating supply"). Finished living space within a basement with registers or heating devices designed to supply heat to a basement space shall automatically define that space as heated space.

HEATING SEASONAL PERFORMANCE FACTOR (HSPF). The total heating output of a heat pump during its normal annual usage period for heating, in Btu, divided by the total electric energy input during the same period, in watt hours, as determined by DOE 10 CFR Part 430, Subpart B, Test Procedures and based on Region 4.

HUMIDISTAT. A regulatory device, actuated by changes in humidity, used for automatic control of relative humidity.

HVAC. Heating, ventilating and air conditioning.

HVAC SYSTEM. The equipment, distribution network, and terminals that provide either collectively or individually the processes of heating, ventilating, or air conditioning to a building.

HVAC SYSTEM COMPONENTS. HVAC system components provide, in one or more factory-assembled packages, means for chilling or heating water, or both, with controlled temperature for delivery to terminal units serving the conditioned spaces of the building. Types of HVAC system components include, but are not limited to, water chiller packages, reciprocating condensing units and water source (hydronic) heat pumps (see "HVAC system equipment").

HVAC SYSTEM EQUIPMENT. HVAC system equipment provides, in one (single package) or more (split system) factory-assembled packages, means for air circulation, air cleaning, air cooling with controlled temperature and dehumidification and, optionally, either alone or in combination with a heating plant, the functions of heating and humidifying. The cooling function is either electrically or heat operated and the refrigerant condenser is air, water or evaporatively cooled. Where the equipment is provided in more than one package, the separate packages shall be designed by the manufacturer to be used together. The equipment shall be permitted to provide the heating function as a heat pump or by the use of electric or fossil-fuel-fired elements. (The word "equipment" used without a modifying adjective, in accordance with common industry usage, applies either to HVAC system equipment or HVAC system components.)

INFILTRATION. The uncontrolled inward air leakage through cracks and interstices in any building element and around windows and doors of a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.

INSULATING SHEATHING. An insulating board having a minimum thermal resistance of R-2 of the core material.

INTEGRATED PART-LOAD VALUE (IPLV). A single number of merit based on part-load EER or COP expressing part-load efficiency for air-conditioning and heat pump equipment on the basis of weighted operation at various load capacities for the equipment.

LABELED. Devices, equipment, appliances, assemblies or materials to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and by whose label the manufacturer attests to compliance with applicable nationally recognized standards.

LISTED. Equipment, appliances, assemblies or materials included in a list published by a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment, appliances, assemblies or material, and whose listing states either that the equipment, appliances, assemblies, or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

LOW-VOLTAGE LIGHTING. Lighting equipment that is powered through a transformer such as cable conductor, rail conductor, and track lighting.

MANUAL. Capable of being operated by personal intervention (see "Automatic").

MULTIFAMILY DWELLING. A building containing three or more dwelling units.

OCCUPANCY. The purpose for which a building, or portion thereof, is utilized or occupied.

OPAQUE AREAS. All exposed areas of a building envelope which enclose conditioned space, except openings for windows, skylights, doors and building service systems.

OUTDOOR AIR. Air taken from the outdoors and, therefore, not previously circulated through the system.

OZONE DEPLETION FACTOR. A relative measure of the potency of chemicals in depleting stratospheric ozone. The ozone depletion factor potential depends upon the chlorine and the bromine content and atmospheric lifetime of the chemical. The depletion factor potential is normalized such that the factor for CFC-11 is set equal to unity and the factors for the other chemicals indicate their potential relative to CFC-11.

PACKAGED TERMINAL AIR CONDITIONER (PTAC). A factory-selected wall sleeve and separate unencased combination of heating and cooling components, assemblies or sections (intended for mounting through the wall to serve a single room or zone). It includes heating capability by hot water, steam, or electricity. (For the complete technical definition, see ARI 310/380.)

PACKAGED TERMINAL HEAT PUMP. A PTAC capable of using the refrigeration system in a reverse cycle or heat pump mode to provide heat. (For the complete technical definition, see ARI 310/380.)

POSITIVE COOLING SUPPLY. Mechanical cooling deliberately supplied to a space, such as through a supply register. Also, mechanical cooling indirectly supplied to a space through uninsulated surfaces of space-cooling components, such as evaporator coil cases and cooling distribution systems which continually maintain air temperatures within the space of 85°F (29°C) or lower during normal operation. To be consid-

ered exempt from inclusion in this definition, such surfaces shall comply with the insulation requirements of this code.

POSITIVE HEAT SUPPLY. Heat deliberately supplied to a space by design, such as a supply register, radiator or heating element. Also, heat indirectly supplied to a space through uninsulated surfaces of service water heaters and space-heating components, such as furnaces, boilers and heating and cooling distribution systems which continually maintain air temperature within the space of 50°F (10°C) or higher during normal operation. To be considered exempt from inclusion in this definition, such surfaces shall comply with the insulation requirements of this code.

PROPOSED DESIGN. A description of the proposed building design used to estimate annual energy costs for determining compliance based on total building performance.

READILY ACCESSIBLE. Capable of being reached quickly for operation, renewal or inspections, without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or access equipment (see "Accessible").

REFRIGERANT. A substance utilized to produce refrigeration by its expansion or vaporization or absorption.

RENEWABLE ENERGY SOURCES. Sources of energy (excluding minerals) derived from incoming solar radiation, including natural daylighting and photosynthetic processes; from phenomena resulting therefrom, including wind, waves and tides, lake or pond thermal differences; and from the internal heat of the earth, including nocturnal thermal exchanges.

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance.

RESIDENTIAL BUILDING, TYPE A-1. Detached one- and two-family dwellings.

RESIDENTIAL BUILDING, TYPE A-2. A building containing multiple (i.e., three or more) dwelling units where the occupants are primarily permanent in nature, such as townhouses, row houses, apartment houses, convents, monasteries, rectories, fraternities and sororities, dormitories, and rooming houses, all of which are three stories or less in height above grade.

ROOF ASSEMBLY. A roof assembly shall be considered as all roof/ceiling components of the building envelope through which heat flows, thus creating a building transmission heat loss or gain, where such assembly is exposed to outdoor air and encloses conditioned space.

The gross area of a roof assembly consists of the total interior surface of all roof/ceiling components, including opaque surfaces, dormer and bay window roofs, treyed ceilings, overhead portions of an interior stairway to an unconditioned attic, doors and hatches, glazing and skylights exposed to conditioned space, that are horizontal or sloped at an angle less than sixty (60) degrees (1.1 rad) from the horizontal (see "Exterior wall"). A roof assembly, or portions thereof, having a slope of 60 degrees (1.1 rad) or greater from horizontal shall be considered in the gross area of exterior walls and thereby excluded from consideration in the roof assembly. Skylight shaft walls 12 inches (305 mm) in depth or greater (as measured from the ceiling plane to the roof deck) shall be considered in the gross area of exterior walls and are thereby excluded from consideration in the roof assembly.

ROOM AIR CONDITIONER. An encased assembly designed as a unit for mounting in a window or through a wall, or as a console. It is designed primarily to provide free delivery of conditioned air to an enclosed space, room or zone. It includes a prime source of refrigeration for cooling and dehumidification and means for circulating and cleaning air, and shall be permitted to also include means for ventilating and heating.

SASH CRACK. The sum of all perimeters of all window sashes, based on overall dimensions of such parts, expressed in feet. If a portion of one sash perimeter overlaps a portion of another sash perimeter, only count the length of the overlapping portions once.

SCREW LAMP HOLDERS. A lamp base that requires a screw-in-type lamp such as an incandescent or tungsten-halogen bulb.

SEASONAL ENERGY EFFICIENCY RATIO (SEER). The total cooling output of an air conditioner during its normal annual usage period for cooling, in Btu/h (W), divided by the total electric energy input during the same period, in watt-hours, as determined by DOE 10 CFR Part 430, Subpart B, Test Procedures.

SERVICE SYSTEMS. All energy-using systems in a building that are operated to provide services for the occupants or processes housed therein, including HVAC, service water heating, illumination, transportation, cooking or food preparation, laundering and similar functions.

SERVICE WATER HEATING. Supply of hot water for purposes other than comfort heating.

SIMULATION TOOL. An approved software program or calculation-based methodology that projects the hour-by-hour loads and annual energy use of a building.

STANDARD DESIGN. A version of the Proposed design that meets the minimum requirements of this code and is used to determine the maximum annual energy cost requirement for compliance based on total building performance.

STANDARD TRUSS. Any construction that does not permit the roof/ceiling insulation to achieve the required *R*-value over the exterior walls.

SKYLIGHT. Glazing that is horizontal or sloped at an angle less than sixty (60) degrees (1.1 rad) from the horizontal (see "Glazing area").

SLAB-ON-GRADE FLOOR INSULATION. Insulation around the perimeter of the floor slab or its supporting foundation when the top edge of the floor perimeter slab is above the finished grade or 12 inches (305 mm) or less below the finished grade.

SOLAR ENERGY SOURCE. Source of natural daylighting and of thermal, chemical or electrical energy derived directly from conversion of incident solar radiation.

SYSTEM. A combination of central or terminal equipment or components or controls, accessories, interconnecting means, and terminal devices by which energy is transformed so as to perform a specific function, such as HVAC, service water heating or illumination.

THERMAL CONDUCTANCE. Time rate of heat flow through a body (frequently per unit area) from one of its bounding surfaces to the other for a unit temperature difference between the two surfaces, under steady conditions (Btu/h ft^2 °F) [W/(m^2 K)].

THERMAL RESISTANCE (*R*). The reciprocal of thermal conductance (h ft^2 °F/Btu) [(m^2 K)/W].

THERMAL RESISTANCE, OVERALL(R_o). The reciprocal of overall thermal conductance (h ft^2 °F/Btu) [(m^2 K)/W]. The overall thermal resistance of the gross area or individual component of the exterior building envelope (such as roof/ceiling, exterior wall, floor, crawl space wall, foundation, window, skylight, door, opaque wall, etc.), which includes the area weighted *R*-values of the specific component assemblies (such as air film, insulation, drywall, framing, glazing, etc.).

THERMAL TRANSMITTANCE (*U*). The coefficient of heat transmission (air to air). It is the time rate of heat flow per unit area and unit temperature difference between the warm-side and cold-side air films (Btu/h ft^2 °F) [W/(m^2 K)]. The *U*-factor applies to combinations of different materials used in series along the heat flow path, single materials that comprise a building section, cavity airspaces and surface air films on both sides of a building element.

THERMAL TRANSMITTANCE, OVERALL (U_o). The overall (average) heat transmission of a gross area of the exterior building envelope (Btu/h ft^2 °F) [W/(m^2 K)]. The U_o-factor applies to the combined effect of the time rate of heat flow through the various parallel paths, such as windows, doors and opaque construction areas, comprising the gross area of one or more exterior building components, such as walls, floors or roof/ceilings.

THERMOSTAT. An automatic control device actuated by temperature and designed to be responsive to temperature.

UNITARY COOLING AND HEATING EQUIPMENT. One or more factory-made assemblies which include an evaporator or cooling coil, a compressor and condenser combination, and which shall be permitted to include a heating function as well. When heating and cooling equipment is provided in more than one assembly, the separate assemblies shall be designed to be used together.

UNITARY HEAT PUMP. One or more factory-made assemblies which include an indoor conditioning coil, compressor(s) and outdoor coil or refrigerant-to-water heat exchanger, including means to provide both heating and cooling functions. When heat pump equipment is provided in more than one assembly, the separate assemblies shall be designed to be used together.

VENTILATION. The process of supplying or removing air by natural or mechanical means to or from any space. Such air shall be permitted to be conditioned or unconditioned.

VENTILATION AIR. That portion of supply air which comes from outside (outdoors) plus any recirculated air that has been treated to maintain the desired quality of air within a designated space (see ASHRAE 62 and definition of "Outdoor air").

➡ **WATER HEATER, INSTANTANEOUS.** A water heater with an input rating of at least 4,000 Btu/h per gallon (310 W/L) stored water and a storage capacity of less than 10 gallons (38 L).

WATER HEATER, STORAGE. A water heater with an input rating less than 4,000 Btu/h per gallon (310 W/L) of stored water or storage capacity of at least 10 gallons (38 L).

WINDOW PROJECTION FACTOR. A measure of the portion of glazing that is shaded by an eave or overhang.

ZONE. A space or group of spaces within a building with heating or cooling requirements, or both, sufficiently similar so that comfort conditions can be maintained throughout by a single controlling device.

CHAPTER 3

DESIGN CONDITIONS

SECTION 301
DESIGN CRITERIA

301.1 General. The criteria of this chapter establish the design conditions for use with Chapters 4, 5, 6 and 8.

SECTION 302
THERMAL DESIGN PARAMETERS

302.1 Exterior design conditions. The following design parameters in Table 302.1 shall be used for calculations required under this code.

TABLE 302.1
EXTERIOR DESIGN CONDITIONS

CONDITION	VALUE
Winter[a], Design Dry-bulb (°F)	
Summer[a], Design Dry-bulb (°F)	
Summer[a], Design Wet-bulb (°F)	
Degree days heating[b]	
Degree days cooling[b]	
Climate zone[c]	

For SI: °C = [(°F)-32]/1.8.

a. The outdoor design temperature shall be selected from the columns of $97^1/_2$ percent values for winter and $2^1/_2$ percent values for summer from tables in the ASHRAE *Handbook of Fundamentals*. Adjustments shall be permitted to reflect local climates which differ from the tabulated temperatures, or local weather experience determined by the code official.

b. The degree days heating (base 65°F) and cooling (base 65°F) shall be selected from NOAA "Annual Degree Days to Selected Bases Derived from the 1961-1990 Normals," the ASHRAE *Handbook of Fundamentals*, data available from adjacent military installations, or other source of local weather data acceptable to the code official.

c. The climate zone shall be selected from the applicable map provided in Figures 302.1(1) through 302.1(51) on the following pages.

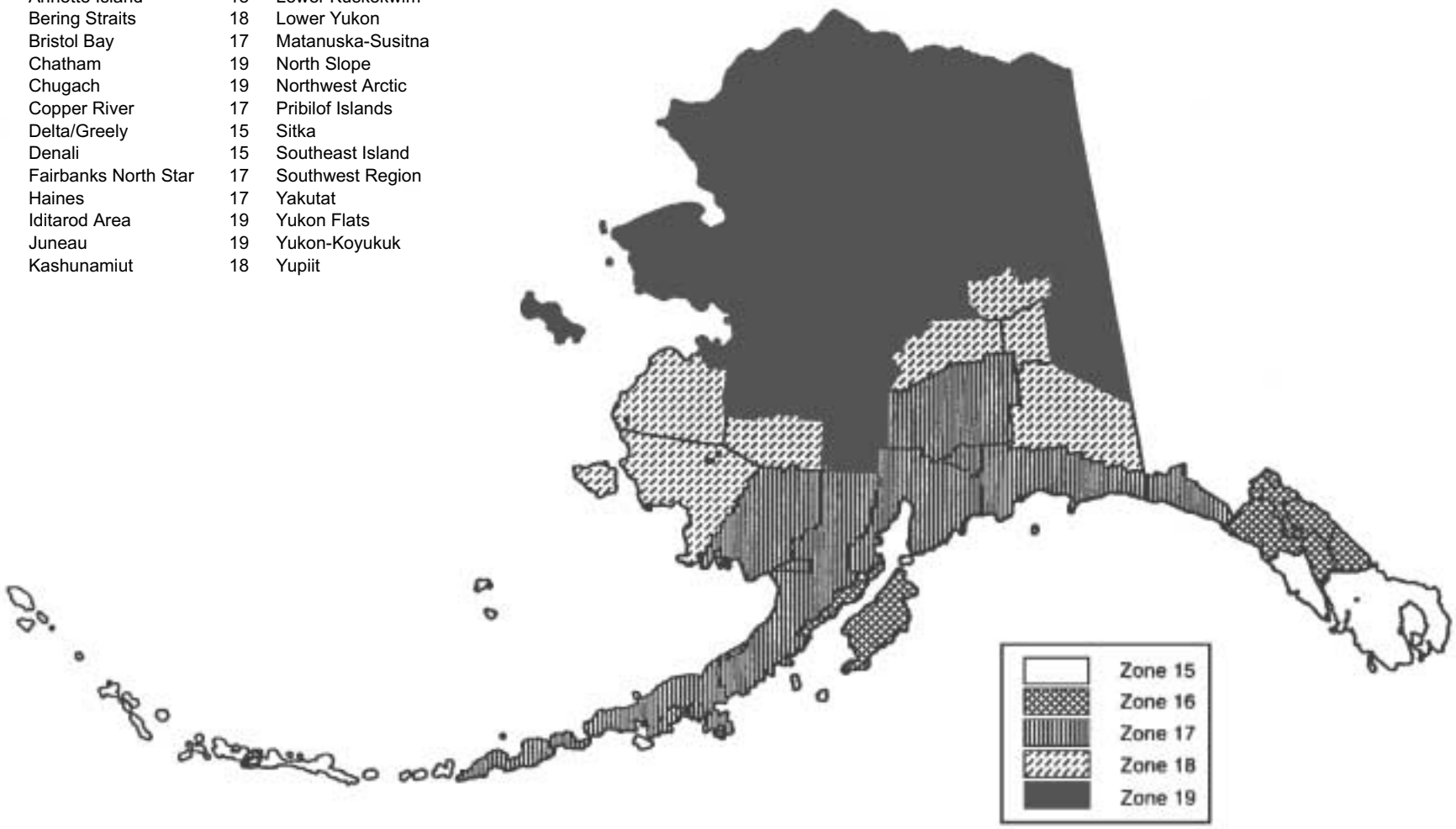
Zone	County
6B	Autauga (H)
4B	Baldwin (H)
5A	Barbour (H)
6B	Bibb (H)
7A	Blount
5A	Bullock (H)
5A	Butler (H)
6B	Calhoun (H)
6B	Chambers (H)
7A	Cherokee
6B	Chilton (H)
5A	Choctaw (H)
5A	Clarke (H)
7A	Clay
7A	Cleburne
4B	Coffee (H)
8	Colbert (H)
5A	Conecuh (H)
6B	Coosa (H)
4B	Covington (H)
5A	Crenshaw (H)
7A	Cullman
4B	Dale (H)
5A	Dallas (H)
8	De Kalb
6B	Elmore (H)
4B	Escambia (H)
7A	Etowah
7A	Fayette
8	Franklin
4B	Geneva (H)
5A	Greene (H)
5A	Hale (H)
4B	Henry (H)

Zone	County
4B	Houston (H)
8	Jackson
6B	Jefferson (H)
7A	Lamar
8	Lauderdale
8	Lawrence
6B	Lee (H)
8	Limestone
5A	Lowndes (H)
6B	Macon (H)
8	Madison
5A	Marengo (H)
7A	Marion
8	Marshall
4B	Mobile (H)
5A	Monroe (H)
6B	Montgomery (H)
8	Morgan
5A	Perry (H)
6B	Pickens (H)
5A	Pike (H)
7A	Randolph
5A	Russell (H)
6B	Shelby (H)
6B	St Clair (H)
5A	Sumter (H)
6B	Talladega (H)
6B	Tallapoosa (H)
6B	Tuscaloosa (H)
6B	Walker (H)
5A	Washington (H)
5A	Wilcox (H)
7A	Winston

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(1)
ALABAMA[a]

Zone	Borough*	Zone	Borough*
16	Adak Region	17	Kenai Peninsula
19	Alaska Gateway	15	Ketchikan Gateway
17	Aleutian Region	16	Kodiak Island
17	Aleutians East	18	Kuspuk
17	Anchorage	17	Lake and Peninsula
15	Annette Island	18	Lower Kuskokwim
19	Bering Straits	18	Lower Yukon
17	Bristol Bay	17	Matanuska-Susitna
16	Chatham	19	North Slope
17	Chugach	19	Northwest Arctic
18	Copper River	17	Pribilof Islands
18	Delta/Greely	15	Sitka
18	Denali	15	Southeast Island
18	Fairbanks North Star	17	Southwest Region
16	Haines	17	Yakutat
19	Iditarod Area	19	Yukon Flats
16	Juneau	19	Yukon-Koyukuk
18	Kashunamiut	18	Yupiit



* Borough refers to Boroughs, United Home Rule Municipalities and Regional Education Attendance Areas.

FIGURE 302.1(2)
ALASKA

Zone	County
13B	Apache
6B	Cochise
14A	Coconino
8	Gila
6B	Graham
6B	Greenlee
3C	La Paz
3C	Maricopa
7B	Mohave
10B	Navajo
4B	Pima
4B	Pinal
6B	Santa Cruz
10B	Yavapai
3C	Yuma

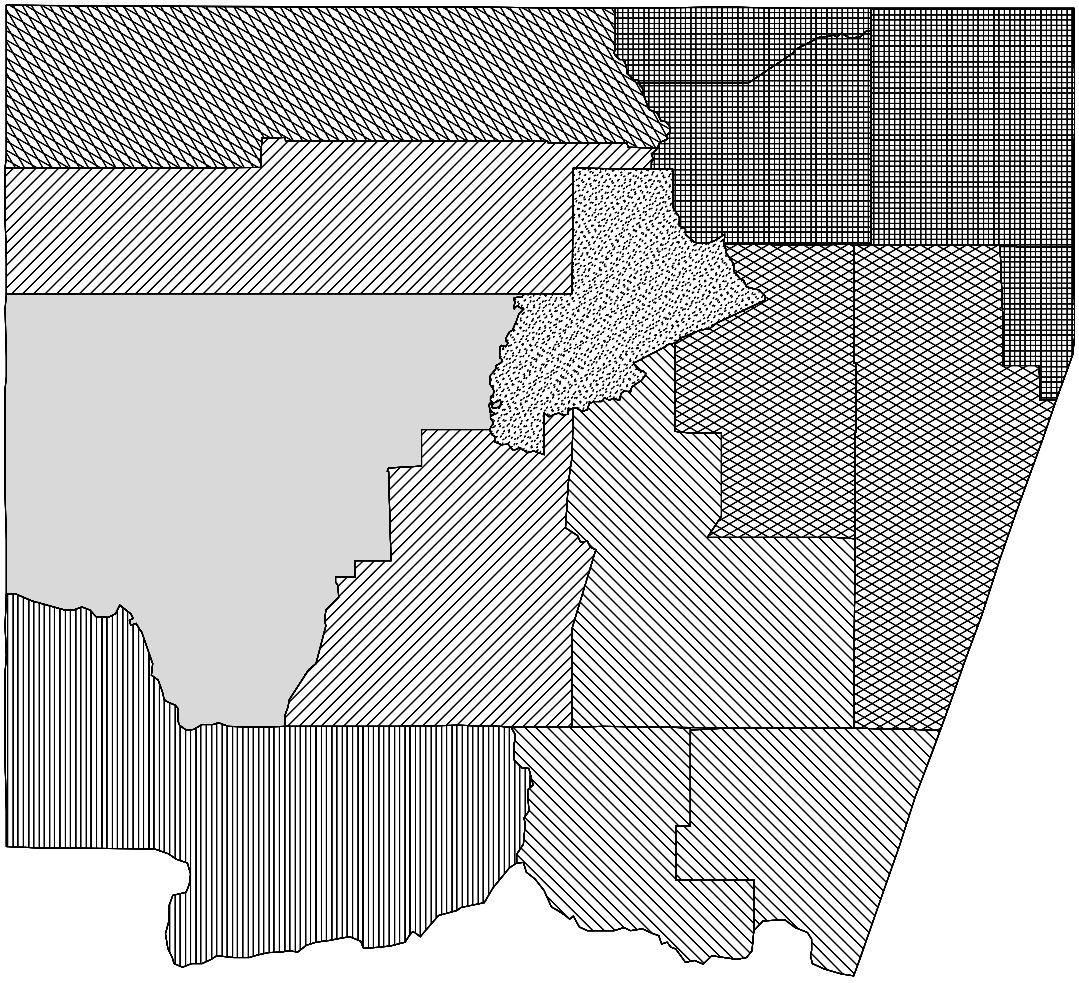


FIGURE 302.1(3)
ARIZONA

Zone	County
6B	Arkansas (H)
6B	Ashley (H)
9B	Baxter
9B	Benton
9B	Boone
6B	Bradley (H)
6B	Calhoun (H)
9B	Carroll
6B	Chicot (H)
6B	Clark (H)
8	Clay
8	Cleburne
6B	Cleveland (H)
6B	Columbia (H)
7B	Conway (H)
8	Craighead
8	Crawford
7B	Crittenden (H)
7B	Cross (H)
6B	Dallas (H)
6B	Desha (H)
6B	Drew (H)
7B	Faulkner (H)
8	Franklin
8	Fulton
7B	Garland (H)
6B	Grant (H)
8	Greene
7B	Hempstead (H)
7B	Hot Spring (H)
7B	Howard (H)
8	Independence
8	Izard
8	Jackson
6B	Jefferson (H)
8	Johnson
6B	Lafayette (H)
8	Lawrence
7B	Lee (H)
6B	Lincoln (H)
6B	Little River (H)
7B	Logan (H)
7B	Lonoke (H)
9B	Madison
9B	Marion
6B	Miller (H)
8	Mississippi
7B	Monroe (H)
8	Montgomery
6B	Nevada (H)
9B	Newton
6B	Ouachita (H)
7B	Perry (H)
7B	Phillips (H)
7B	Pike (H)
8	Poinsett
8	Polk
8	Pope
7B	Prairie (H)
7B	Pulaski (H)
8	Randolph
7B	Saline (H)
7B	Scott (H)
9B	Searcy
8	Sebastian
7B	Sevier (H)
8	Sharp
7B	St Francis (H)
9B	Stone
6B	Union (H)
8	Van Buren
9B	Washington
7B	White (H)
7B	Woodruff (H)
7B	Yell (H)

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(4)
ARKANSAS[a]

Zone	County
6A	Alameda
15	Alpine
8	Amador
6B	Butte
8	Calaveras
6B	Colusa
6A	Contra Costa
9A	Del Norte
8	El Dorado
6B	Fresno
6B	Glenn
9A	Humboldt
3A	Imperial
9B	Inyo
5B	Kern
6B	Kings
8	Lake
13B	Lassen
4A	Los Angeles
6B	Madera
6A	Marin
8	Mariposa
8	Mendocino
6B	Merced
15	Modoc
15	Mono
6A	Monterey
6A	Napa
11A	Nevada
4A	Orange
8	Placer
13B	Plumas
4B	Riverside
6B	Sacramento
6B	San Benito
4B	San Bernardino
3A	San Diego
6A	San Francisco
6A	San Joaquin
6A	San Luis Obispo
6A	San Mateo
5A	Santa Barbara
6A	Santa Clara
6A	Santa Cruz
6B	Shasta
11A	Sierra
11A	Siskiyou
6A	Solano
6A	Sonoma
6B	Stanislaus
6B	Sutter
6B	Tehama
9B	Trinity
6B	Tulare
8	Tuolumne
4A	Ventura
6B	Yolo
6B	Yuba

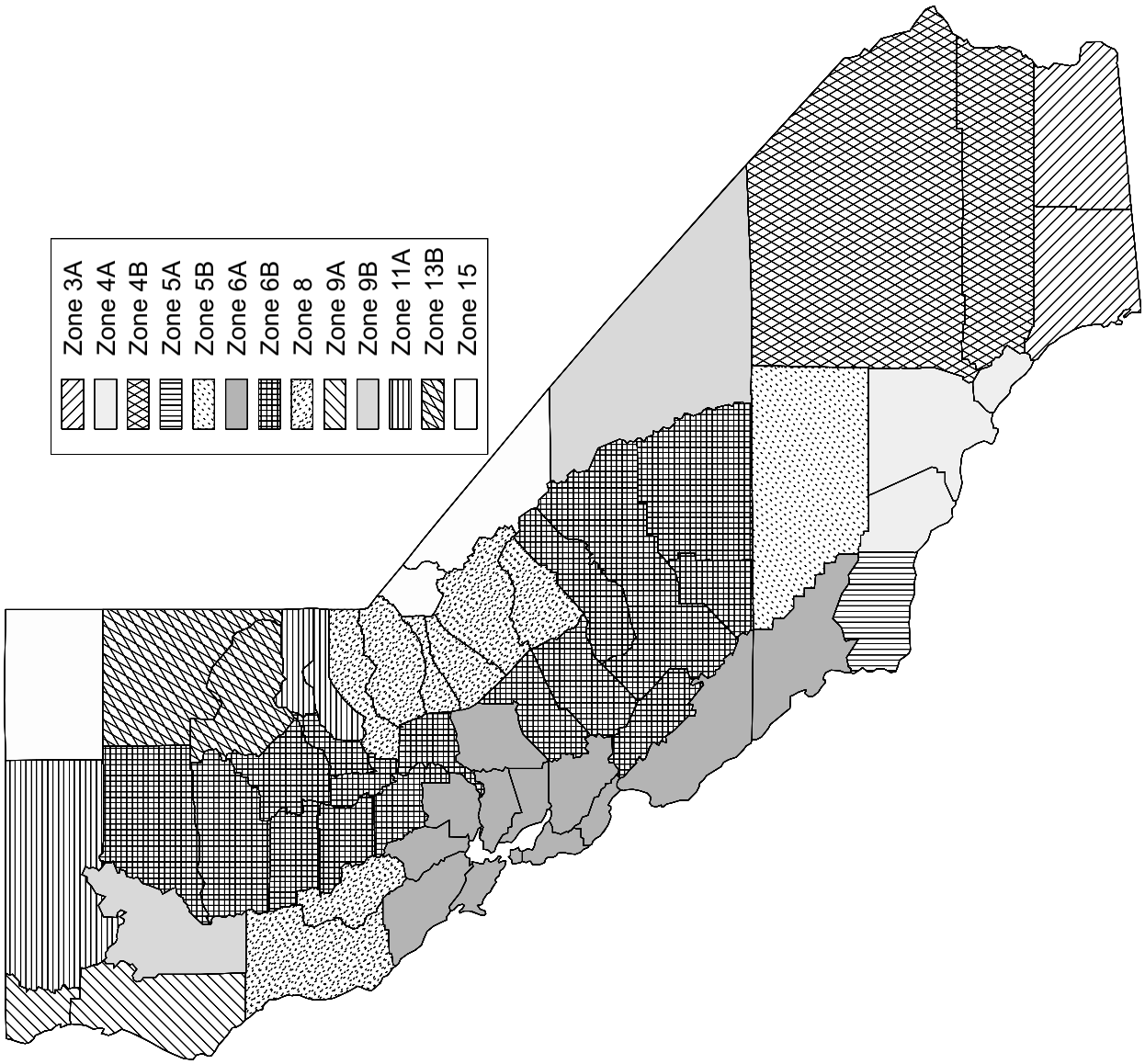


FIGURE 302.1(5)
CALIFORNIA

Zone	County
13B	Adams
16	Alamosa
13B	Arapahoe
16	Archuleta
11B	Baca
11B	Bent
13B	Boulder
16	Chaffee
13B	Cheyenne
17	Clear Creek
16	Conejos
16	Costilla
11B	Crowley
16	Custer
13B	Delta
13B	Denver
15	Dolores
13B	Douglas
15	Eagle
13B	El Paso
13B	Elbert
11B	Fremont
15	Garfield
13B	Gilpin
17	Grand
17	Gunnison
17	Hinsdale
11B	Huerfano
17	Jackson
13B	Jefferson
13B	Kiowa
13B	Kit Carson

Zone	County
15	La Plata
17	Lake
13B	Larimer
11B	Las Animas
13B	Lincoln
13B	Logan
13B	Mesa
17	Mineral
15	Moffat
15	Montezuma
13B	Montrose
13B	Morgan
11B	Otero
15	Ouray
17	Park
13B	Phillips
17	Pitkin
11B	Prowers
11B	Pueblo
15	Rio Blanco
17	Rio Grande
17	Routt
16	Saguache
17	San Juan
15	San Miguel
13B	Sedgwick
17	Summit
13B	Teller
13B	Washington
13B	Weld
13B	Yuma

FIGURE 302.1(6)
COLORADO

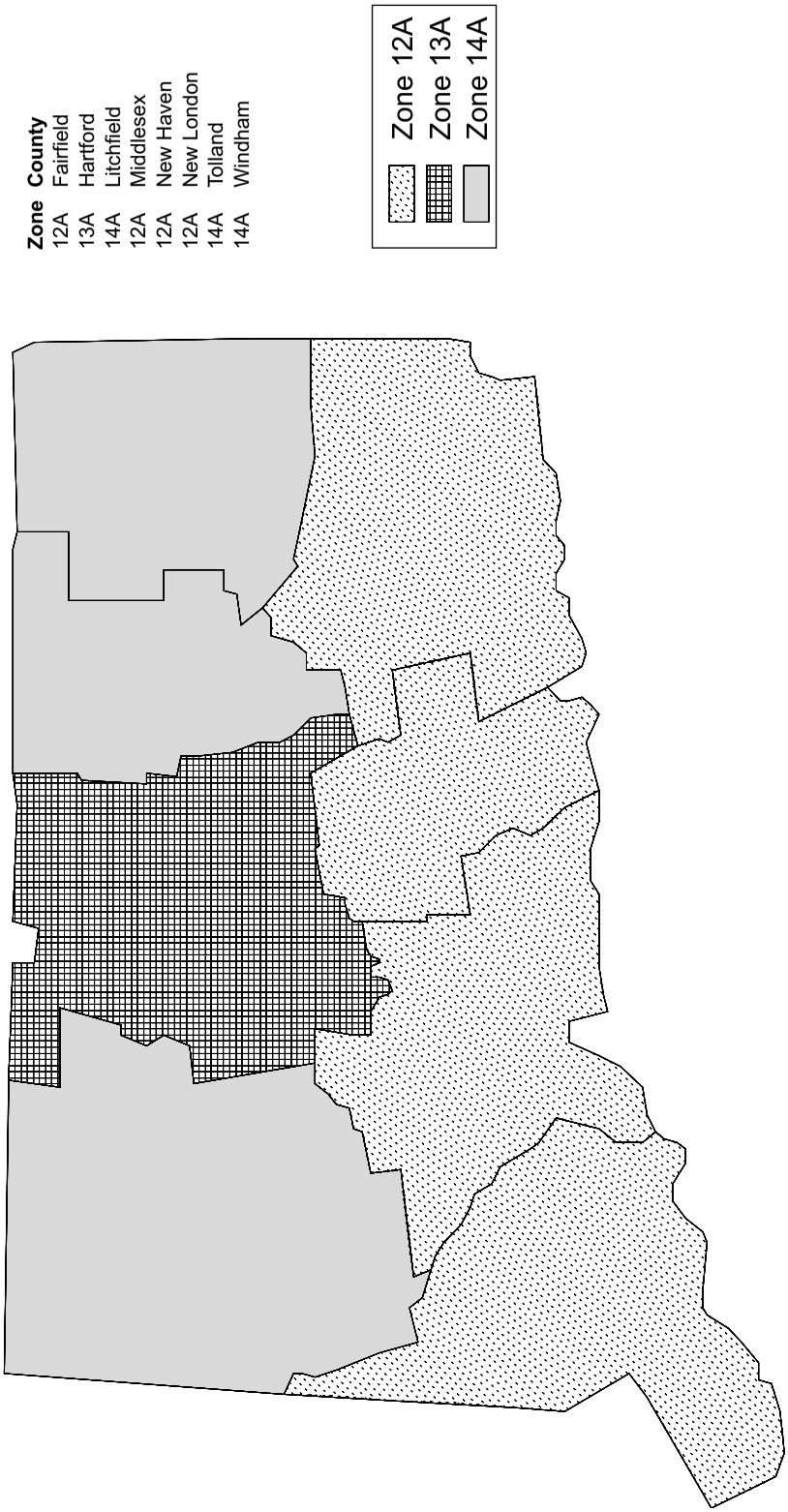


FIGURE 302.1(7)
CONNECTICUT

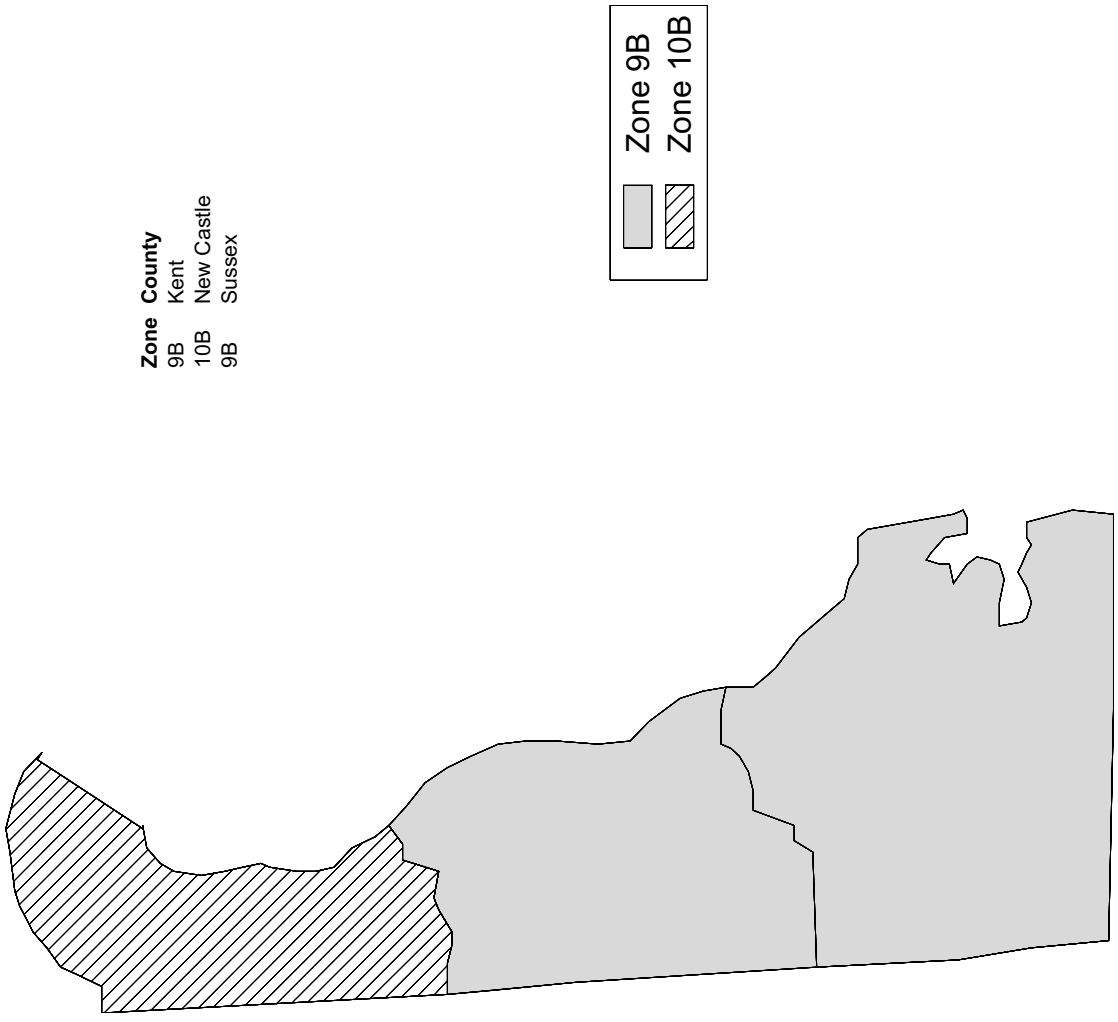


FIGURE 302.1(8)
DELAWARE

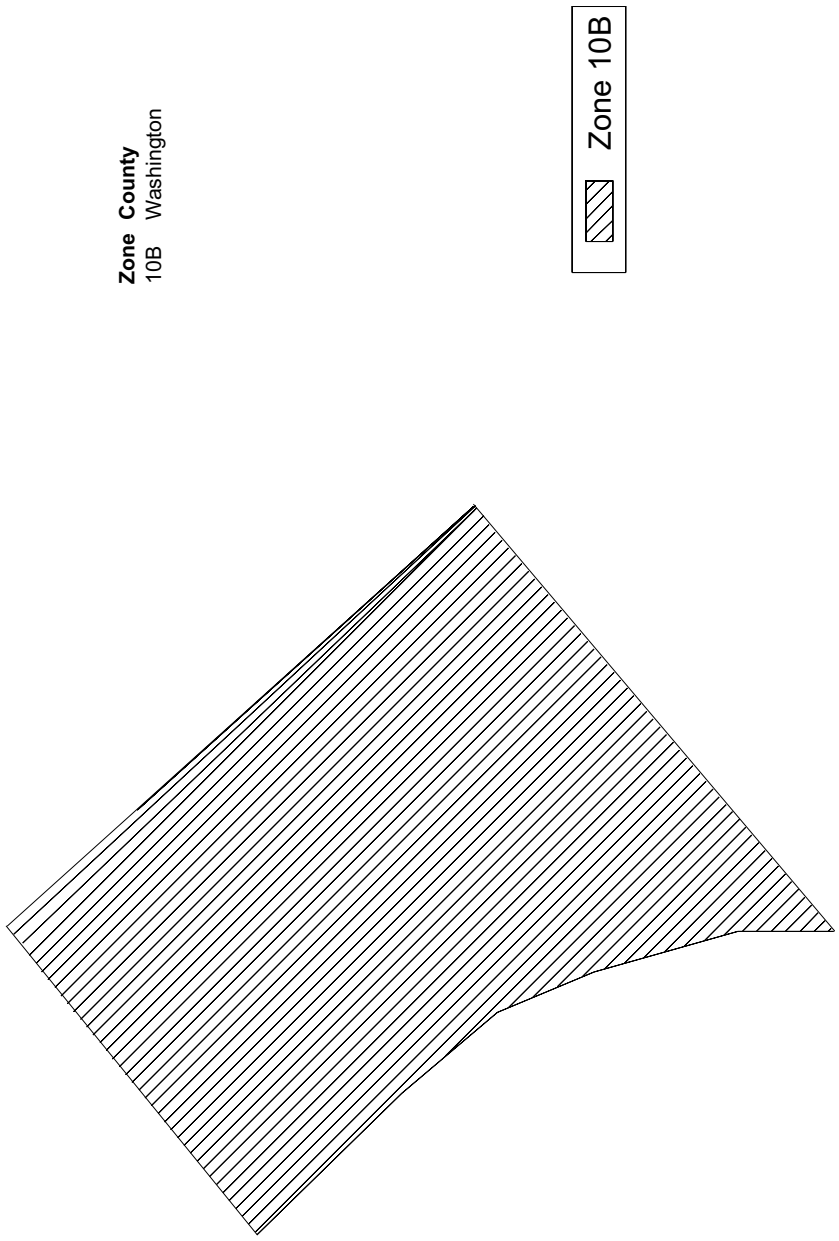


FIGURE 302.1(9)
DISTRICT OF COLUMBIA

Zone	County	Zone	County
3B	Alachua (H)	2A	Lake (H)
3B	Baker (H)	1B	Lee (H)
4B	Bay (H)	4B	Leon (H)
3B	Bradford (H)	2A	Levy (H)
2A	Brevard (H)	4B	Liberty (H)
1B	Broward (H)	3B	Madison (H)
4B	Calhoun (H)	2A	Manatee (H)
2A	Charlotte (H)	2A	Marion (H)
2A	Citrus (H)	1B	Martin (H)
3B	Clay (H)	1B	Monroe (H)
1B	Collier (H)	3B	Nassau (H)
3B	Columbia (H)	4B	Okaloosa (H)
1B	Dade (H)	2A	Okeechobee (H)
2A	De Soto (H)	2A	Orange (H)
3B	Dixie (H)	2A	Osceola (H)
3B	Duval (H)	1B	Palm Beach (H)
4B	Escambia (H)	2A	Pasco (H)
3B	Flagler (H)	2A	Pinellas (H)
4B	Franklin (H)	2A	Polk (H)
4B	Gadsden (H)	3B	Putnam (H)
3B	Gilchrist (H)	4B	Santa Rosa (H)
1B	Glades (H)	2A	Sarasota (H)
4B	Gulf (H)	2A	Seminole (H)
3B	Hamilton (H)	3B	St Johns (H)
2A	Hardee (H)	2A	St Lucie (H)
1B	Hendry (H)	2A	Sumter (H)
2A	Hernando (H)	3B	Suwannee (H)
2A	Highlands (H)	3B	Taylor (H)
2A	Hillsborough (H)	3B	Union (H)
4B	Holmes (H)	2A	Volusia (H)
2A	Indian River (H)	4B	Wakulla (H)
4B	Jackson (H)	4B	Walton (H)
4B	Jefferson (H)	4B	Washington (H)
3B	Lafayette (H)		

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(10)
FLORIDA[a]

Zone	County
4B	Appling (H)
4B	Atkinson (H)
4B	Bacon (H)
4B	Baker (H)
6B	Baldwin (H)
7A	Banks
7A	Barrow
7A	Bartow
5A	Ben Hill (H)
4B	Berrien (H)
5A	Bibb (H)
5A	Bleckley (H)
4B	Brantley (H)
4B	Brooks (H)
4B	Bryan (H)
5A	Bulloch (H)
6B	Burke (H)
7A	Butts
5A	Calhoun (H)
4B	Camden (H)
5A	Candler (H)
7A	Carroll
8	Catoosa
4B	Charlton (H)
4B	Chatham (H)
5A	Chattahoochee (H)
8	Chattooga
8	Cherokee
7A	Clarke
5A	Clay (H)
7A	Clayton
4B	Clinch (H)
7A	Cobb
5A	Coffee (H)
4B	Colquitt (H)
6B	Columbia (H)
4B	Cook (H)
7A	Coweta
5A	Crawford (H)
5A	Crisp (H)
8	Dade
8	Dawson
7A	De Kalb
4B	Decatur (H)
5A	Dodge (H)
5A	Dooly (H)
5A	Dougherty (H)
7A	Douglas
5A	Early (H)
4B	Echols (H)
4B	Effingham (H)
7A	Elbert
5A	Emanuel (H)
4B	Evans (H)
8	Fannin
7A	Fayette
7A	Floyd
8	Forsyth
7A	Franklin
7A	Fulton
8	Gilmer
6B	Glascock (H)
4B	Glynn (H)
8	Gordon
4B	Grady (H)
6B	Greene (H)
7A	Gwinnett
8	Habersham
7A	Hall
6B	Hancock (H)
7A	Haralson
6B	Harris (H)
7A	Hart
6B	Heard (H)
7A	Henry
5A	Houston (H)
5A	Irwin (H)
7A	Jackson
6B	Jasper (H)
4B	Jeff Davis (H)
6B	Jefferson (H)
5A	Jenkins (H)
5A	Johnson (H)
6B	Jones (H)
6B	Lamar (H)
4B	Lanier (H)
5A	Laurens (H)
5A	Lee (H)
4B	Liberty (H)
6B	Lincoln (H)
4B	Long (H)
4B	Lowndes (H)
8	Lumpkin
5A	Macon (H)
7A	Madison
5A	Marion (H)
6B	McDuffie (H)
4B	McIntosh (H)
6B	Meriwether (H)
4B	Miller (H)
4B	Mitchell (H)
6B	Monroe (H)
5A	Montgomery (H)
6B	Morgan (H)
8	Murray
5A	Muscogee (H)
7A	Newton
7A	Oconee
7A	Oglethorpe
7A	Paulding
5A	Peach (H)
8	Pickens
4B	Pierce (H)
6B	Pike (H)
7A	Polk
5A	Pulaski (H)
6B	Putnam (H)
5A	Quitman (H)
8	Rabun
5A	Randolph (H)
6B	Richmond (H)
7A	Rockdale
5A	Schley (H)
5A	Screven (H)
4B	Seminole (H)
7A	Spalding
7A	Stephens
5A	Stewart (H)
5A	Sumter (H)
5A	Talbot (H)
6B	Taliaferro (H)
4B	Tattnall (H)
5A	Taylor (H)
5A	Telfair (H)
5A	Terrell (H)
4B	Thomas (H)
5A	Tift (H)
4B	Toombs (H)
8	Towns
5A	Treutlen (H)
5A	Troup (H)
6B	Turner (H)
5A	Twiggs (H)
5A	Union
8	Upson (H)
5A	Walker
8	Walton
7A	Ware (H)
4B	Warren (H)
6B	Washington (H)
6B	Wayne (H)
4B	Webster (H)
5A	Wheeler (H)
5A	White
8	Whitfield
8	Wilcox (H)
5A	Wilkes
7A	Wilkinson (H)
5A	Worth (H)

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(11)
GEORGIA[a]

Zone	County
1A	Hawaii (H)
1A	Honolulu (H)
1A	Kalawao(H)
1A	Kauai H)
1A	Maui (H)

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(12)
HAWAII[a]

Zone	County
12B	Ada
15	Adams
15	Bannock
15	Bear Lake
14A	Benewah
15	Bingham
16	Blaine
15	Boise
15	Bonner
15	Bonneville
15	Boundary
16	Butte
15	Camas
12B	Canyon
15	Caribou
14B	Cassia
15	Clark
12B	Clearwater
16	Custer
13B	Elmore
15	Franklin
16	Fremont

Zone	County
13B	Gem
13B	Gooding
15	Idaho
16	Jefferson
14B	Jerome
14A	Kootenai
14A	Latah
15	Lemhi
15	Lewis
15	Lincoln
16	Madison
15	Minidoka
12B	Nez Perce
15	Oneida
12B	Owyhee
12B	Payette
15	Power
14A	Shoshone
16	Teton
14B	Twin Falls
16	Valley
13B	Washington

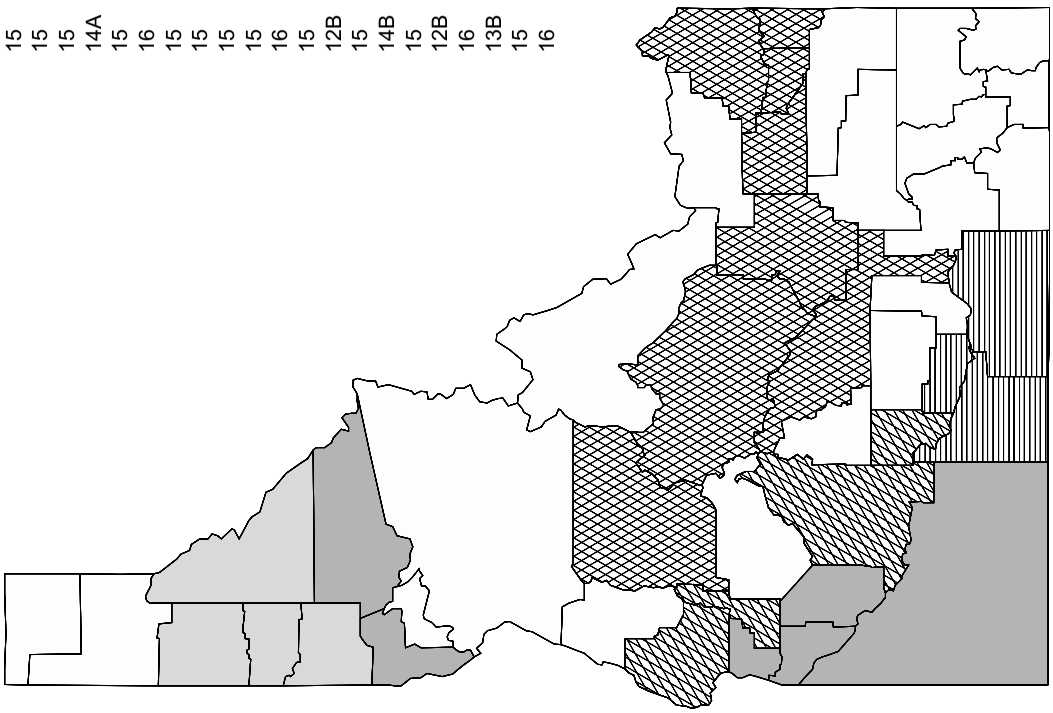


FIGURE 302.1(13)
IDAHO

Zone	County
12B	Adams
10B	Alexander
11B	Bond
14B	Boone
12B	Brown
13B	Bureau
11B	Calhoun
14B	Carroll
12B	Cass
12B	Champaign
11B	Christian
12B	Clark
11B	Clay
10B	Clinton
12B	Coles
14B	Cook
11B	Crawford
12B	Cumberland
14B	De Kalb
12B	De Witt
12B	Douglas
14B	Du Page
12B	Edgar
11B	Edwards
11B	Effingham
11B	Fayette
13B	Ford
10B	Franklin
13B	Fulton
10B	Gallatin
11B	Greene
13B	Grundy
10B	Hamilton
13B	Hancock

Zone	County
10B	Hardin
13B	Henderson
13B	Henry
13B	Iroquois
10B	Jackson
11B	Jasper
11B	Jefferson
10B	Jersey
14B	Jo Daviess
10B	Johnson
14B	Kane
13B	Kankakee
13B	Kendall
13B	Knox
13B	La Salle
14B	Lake
11B	Lawrence
14B	Lee
13B	Livingston
12B	Logan
12B	Macon
11B	Macoupin
10B	Madison
11B	Marion
13B	Marshall
12B	Mason
10B	Massac
13B	McDonough
14B	McHenry
12B	McLean
12B	Menard
13B	Mercer
10B	Monroe
11B	Montgomery

Zone	County
12B	Morgan
12B	Moultrie
14B	Ogle
13B	Peoria
10B	Perry
12B	Piatt
12B	Pike
10B	Pope
10B	Pulaski
13B	Putnam
10B	Randolph
11B	Richland
13B	Rock Island
10B	Saline
12B	Sangamon
12B	Schuyler
12B	Scott
11B	Shelby
10B	St Clair
13B	Stark
14B	Stephenson
12B	Tazewell
10B	Union
12B	Vermilion
11B	Wabash
13B	Warren
10B	Washington
11B	Wayne
10B	White
14B	Whiteside
13B	Will
10B	Williamson
14B	Winnebago
13B	Woodford

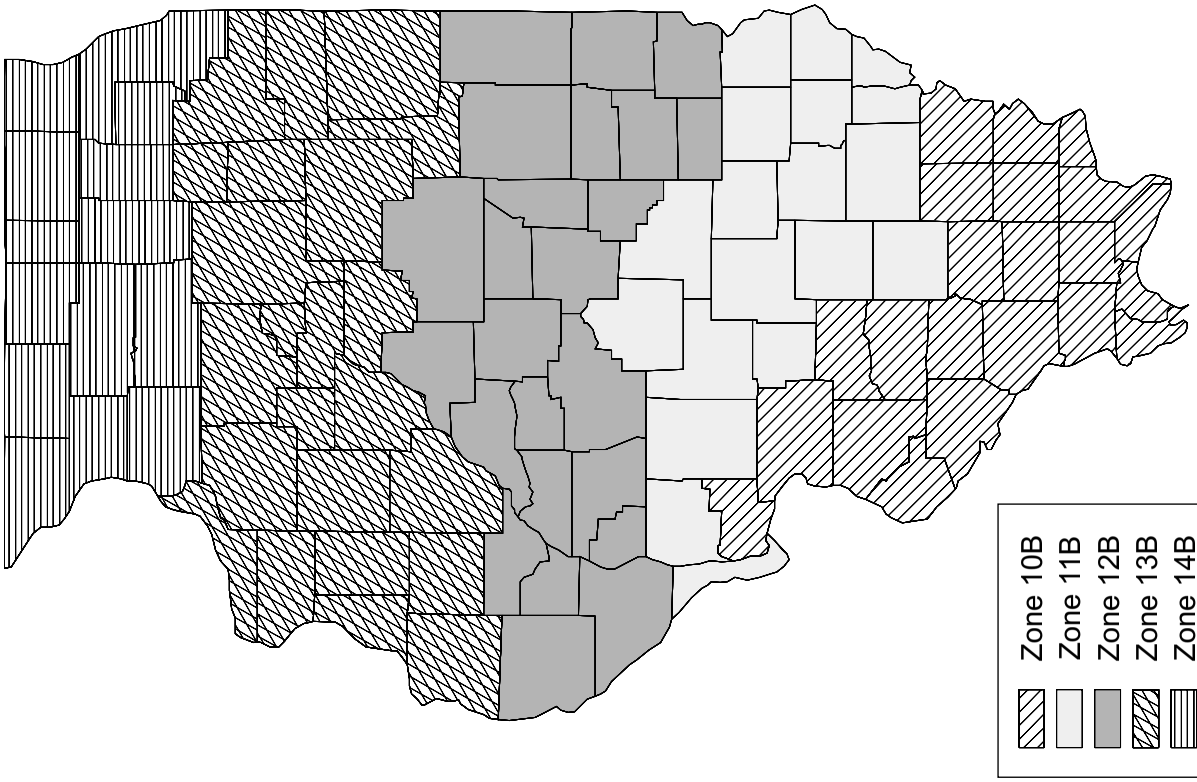


FIGURE 302.1(14)
ILLINOIS

Zone	County
13B	Adams
13B	Allen
11B	Bartholomew
13B	Benton
13B	Blackford
12B	Boone
11B	Brown
13B	Carroll
13B	Cass
10B	Clark
12B	Clay
13B	Clinton
11B	Crawford
11B	Daviess
13B	De Kalb
11B	Dearborn
12B	Decatur
13B	Delaware
11B	Dubois
13B	Elkhart
12B	Fayette
10B	Floyd
12B	Fountain
12B	Franklin
14A	Fulton
10B	Gibson
13B	Grant
11B	Greene
12B	Hamilton
12B	Hancock
10B	Harrison
12B	Hendricks
12B	Henry
13B	Howard
14A	Huntington
11B	Jackson
13B	Jasper
13B	Jay
10B	Jefferson
11B	Jennings
12B	Johnson
11B	Knox
14A	Kosciusko
13B	La Porte
14A	Lagrange
13B	Lake
11B	Lawrence
13B	Madison
12B	Marion
13B	Marshall
11B	Martin
14A	Miami
11B	Monroe
12B	Montgomery
12B	Morgan
13B	Newton
14A	Noble
11B	Ohio
11B	Orange
12B	Owen
12B	Parke
10B	Perry
11B	Pike
13B	Porter
10B	Posey
13B	Pulaski
12B	Putnam
13B	Randolph
11B	Ripley
12B	Rush
11B	Scott
12B	Shelby
10B	Spencer
13B	St Joseph
13B	Starke
14A	Steuben
11B	Sullivan
10B	Switzerland
13B	Tippecanoe
13B	Tipton
12B	Union
10B	Vanderburgh
12B	Vermillion
12B	Vigo
14A	Wabash
12B	Warren
10B	Warrick
11B	Washington
12B	Wayne
13B	Wells
13B	White
14A	Whitley

FIGURE 302.1(15)
INDIANA

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
14B	Adair	15	Bremer	15	Cerro Gordo	14B	Dallas	15	Fayette	15	Hancock	14B	Jackson	15	Mitchell
13B	Adams	15	Buchanan	15	Cherokee	13B	Davis	15	Floyd	15	Hardin	14B	Jasper	14B	Monona
15	Allamakee	15	Buena Vista	15	Chickasaw	13B	Decatur	15	Franklin	14B	Harrison	13B	Jefferson	13B	Monroe
13B	Appanoose	15	Butler	13B	Clarke	15	Delaware	13B	Fremont	13B	Henry	13B	Johnson	13B	Montgomery
14B	Audubon	15	Calhoun	15	Clay	13B	Des Moines	14B	Greene	15	Howard	14B	Jones	13B	Muscatine
14B	Benton	14B	Carroll	15	Clayton	15	Dickinson	15	Grundy	15	Humboldt	13B	Keokuk	15	O'Brien
15	Black Hawk	14B	Cass	13B	Clinton	14B	Dubuque	14B	Guthrie	15	Ida	15	Kossuth	15	Osceola
14B	Boone	14B	Cedar	14B	Crawford	15	Emmet	15	Hamilton	14B	Iowa	13B	Lee	13B	Page
												14B	Linn	15	Palo Alto
												13B	Louisa	15	Plymouth
												13B	Lucas	15	Pocahontas
												15	Lyon	14B	Polk
												14B	Madison	14B	Pottawattamie
												13B	Mahaska	14B	Poweshiek
												13B	Marion	13B	Ringgold
												14B	Marshall	15	Sac
												13B	Mills	13B	Scott
														14B	Shelby
														15	Sioux
														14B	Story
														14B	Tama
														13B	Taylor
														13B	Union
														13B	Van Buren
														13B	Wapello
														14B	Warren
														13B	Washington
														13B	Wayne
														15	Webster
														15	Winnebago
														15	Winneshiek
														15	Woodbury
														15	Worth
														15	Wright

FIGURE 302.1(16)
IOWA

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
10B	Allen	9B	Cherokee	11B	Dickinson	11B	Geary	11B	Haskell	12B	Lane	10B	Miami	12B	Osborne
10B	Anderson	13B	Cheyenne	11B	Doniphan	12B	Gove	11B	Hodgeman	11B	Leavenworth	12B	Mitchell	11B	Ottawa
11B	Atchison	10B	Clark	10B	Douglas	12B	Graham	11B	Jackson	11B	Lincoln	9B	Montgomery	11B	Pawnee
9B	Barber	11B	Clay	11B	Edwards	11B	Grant	11B	Jefferson	10B	Linn	11B	Morris	12B	Phillips
11B	Barton	12B	Cloud	9B	Elk	11B	Gray	12B	Jewell	12B	Logan	10B	Morton	11B	Pottawatomie
10B	Bourbon	10B	Coffey	12B	Ellis	12B	Greeley	11B	Johnson	11B	Lyon	11B	Nemaha	10B	Pratt
11B	Brown	9B	Comanche	11B	Ellsworth	10B	Greenwood	11B	Kearny	11B	Marion	9B	Neosho	13B	Rawlins
10B	Butler	9B	Cowley	11B	Finney	11B	Hamilton	10B	Kingman	12B	Marshall	12B	Ness	11B	Reno
10B	Chase	9B	Crawford	11B	Ford	9B	Harper	10B	Kiowa	11B	McPherson	13B	Norton	12B	Republic
9B	Chautauqua	13B	Decatur	10B	Franklin	11B	Harvey	9B	Labette	10B	Meade	10B	Osage	11B	Rice
														11B	Riley
														12B	Rooks
														11B	Rush
														11B	Russell
														11B	Saline
														12B	Scott
														10B	Sedgwick
														10B	Seward
														11B	Shawnee
														12B	Sheridan
														13B	Sherman
														12B	Smith
														11B	Stafford
														11B	Stanton
														10B	Stevens
														9B	Sumner
														13B	Thomas
														12B	Trego
														11B	Wabaunsee
														12B	Wallace
														12B	Washington
														12B	Wichita
														9B	Wilson
														10B	Woodson
														11B	Wyandotte

FIGURE 302.1(17)
KANSAS

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
9B	Adair	9B	Caldwell	10B	Estill	11B	Harrison	10B	Lee	9B	McCracken	11B	Nicholas	11B	Scott
9B	Allen	9B	Calloway	10B	Fayette	9B	Hart	10B	Leslie	10B	McCreary	9B	Ohio	10B	Shelby
10B	Anderson	11B	Campbell	11B	Fleming	9B	Henderson	10B	Letcher	9B	McLean	10B	Oldham	9B	Simpson
9B	Ballard	9B	Carlisle	10B	Floyd	10B	Henry	11B	Lewis	9B	Meade	10B	Owen	10B	Spencer
9B	Barren	10B	Carroll	10B	Franklin	9B	Hickman	10B	Lincoln	10B	Menifee	10B	Owsley	9B	Taylor
11B	Bath	11B	Carter	9B	Fulton	9B	Hopkins	9B	Livingston	10B	Mercer	11B	Pendleton	9B	Todd
10B	Bell	10B	Casey	11B	Gallatin	10B	Jackson	9B	Logan	9B	Metcalfe	10B	Perry	9B	Trigg
11B	Boone	9B	Christian	10B	Garrard	10B	Jefferson	9B	Lyon	9B	Monroe	10B	Pike	10B	Trimble
10B	Bourbon	10B	Clark	11B	Grant	10B	Jessamine	10B	Madison	10B	Montgomery	10B	Powell	9B	Union
11B	Boyd	10B	Clay	9B	Graves	11B	Johnson	10B	Magoffin	10B	Morgan	10B	Pulaski	9B	Warren
10B	Boyle	10B	Clinton	9B	Grayson	11B	Kenton	10B	Marion	9B	Muhlenberg	11B	Robertson	10B	Washington
11B	Bracken	9B	Crittenden	9B	Green	10B	Knott	9B	Marshall	10B	Nelson	10B	Rockcastle	10B	Wayne
10B	Breathitt	9B	Cumberland	11B	Greenup	10B	Knox	11B	Martin			11B	Rowan	9B	Webster
9B	Breckenridge	9B	Daviess	9B	Hancock	9B	Larue	11B	Mason			10B	Russell	10B	Whitley
10B	Bullitt	9B	Edmonson	9B	Hardin	10B	Laurel							10B	Wolfe
9B	Butler	11B	Elliot	10B	Harlan	11B	Lawrence							10B	Woodford

FIGURE 302.1(18)
KENTUCKY

Zone	Parish
4B	Acadia (H)
4B	Allen (H)
4B	Ascension (H)
3B	Assumption (H)
5A	Avoyelles (H)
4B	Beauregard (H)
6B	Bienville (H)
6B	Bossier (H)
6B	Caddo (H)
4B	Calcasieu (H)
6B	Caldwell (H)
4B	Cameron (H)
5A	Catahoula (H)
6B	Claiborne (H)
5A	Concordia (H)
5A	De Soto (H)
4B	East Baton Rouge (H)
6B	East Carroll (H)
4B	East Feliciana (H)
4B	Evangeline (H)
6B	Franklin (H)
5A	Grant (H)
4B	Iberia (H)
4B	Iberville (H)
6B	Jackson (H)
3B	Jefferson (H)
4B	Jefferson Davis (H)
5A	La Salle (H)
4B	Lafayette (H)
3B	Lafourche (H)
6B	Lincoln (H)
4B	Livingston (H)
6B	Madison (H)
6B	Morehouse (H)
5A	Natchitoches (H)
3B	Orleans (H)
6B	Ouachita (H)
3B	Plaquemines (H)
4B	Pointe Coupee (H)
5A	Rapides (H)
5A	Red River (H)
6B	Richland (H)
5A	Sabine (H)
3B	St Bernard (H)
3B	St Charles (H)
4B	St Helena (H)
3B	St James (H)
3B	St John The Baptist (H)
4B	St Landry (H)
4B	St Martin (H)
3B	St Mary (H)
4B	St Tammany (H)
4B	Tangipahoa (H)
5A	Tensas (H)
3B	Terrebonne (H)
6B	Union (H)
4B	Vermilion (H)
5A	Vernon (H)
4B	Washington (H)
6B	Webster (H)
4B	West Baton Rouge (H)
6B	West Carroll (H)
4B	West Feliciana (H)
5A	Winn (H)

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(19)
LOUISIANA[a]

Zone	County
15	Androscoggin
17	Aroostook
15	Cumberland
16	Franklin
15	Hancock
15	Kennebec
15	Knox
15	Lincoln
16	Oxford
15	Penobscot
17	Piscataquis
15	Sagadahoc
17	Somerset
15	Waldo
15	Washington
15	York

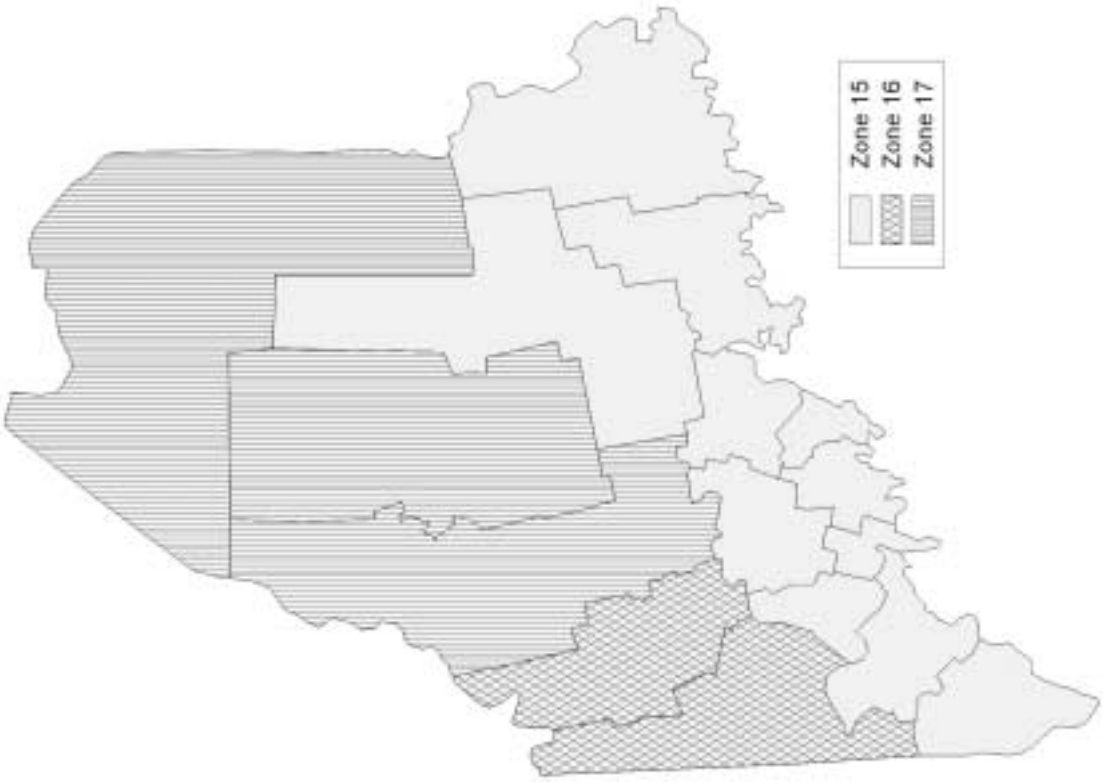


FIGURE 302.1(20)
MAINE

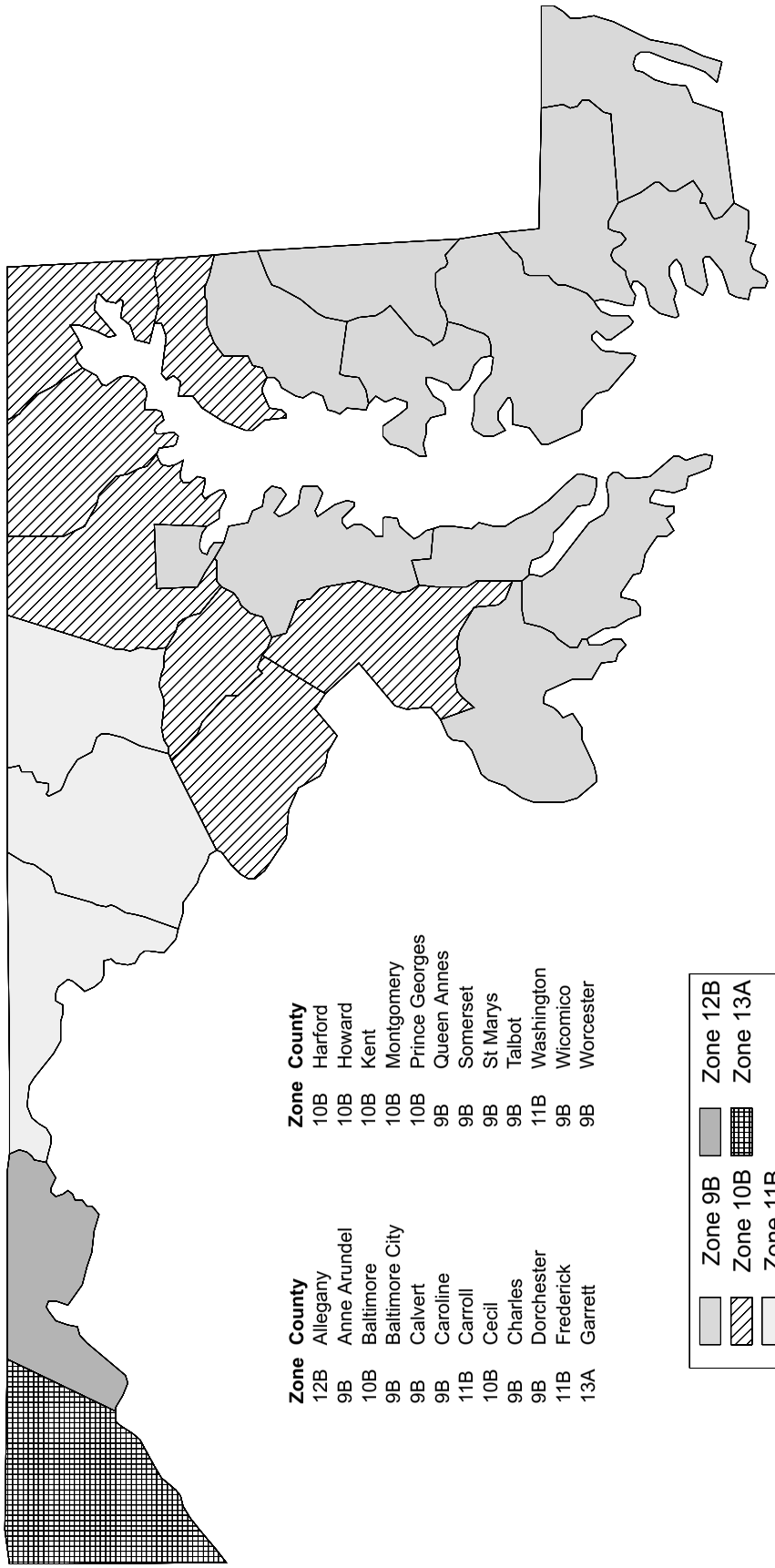
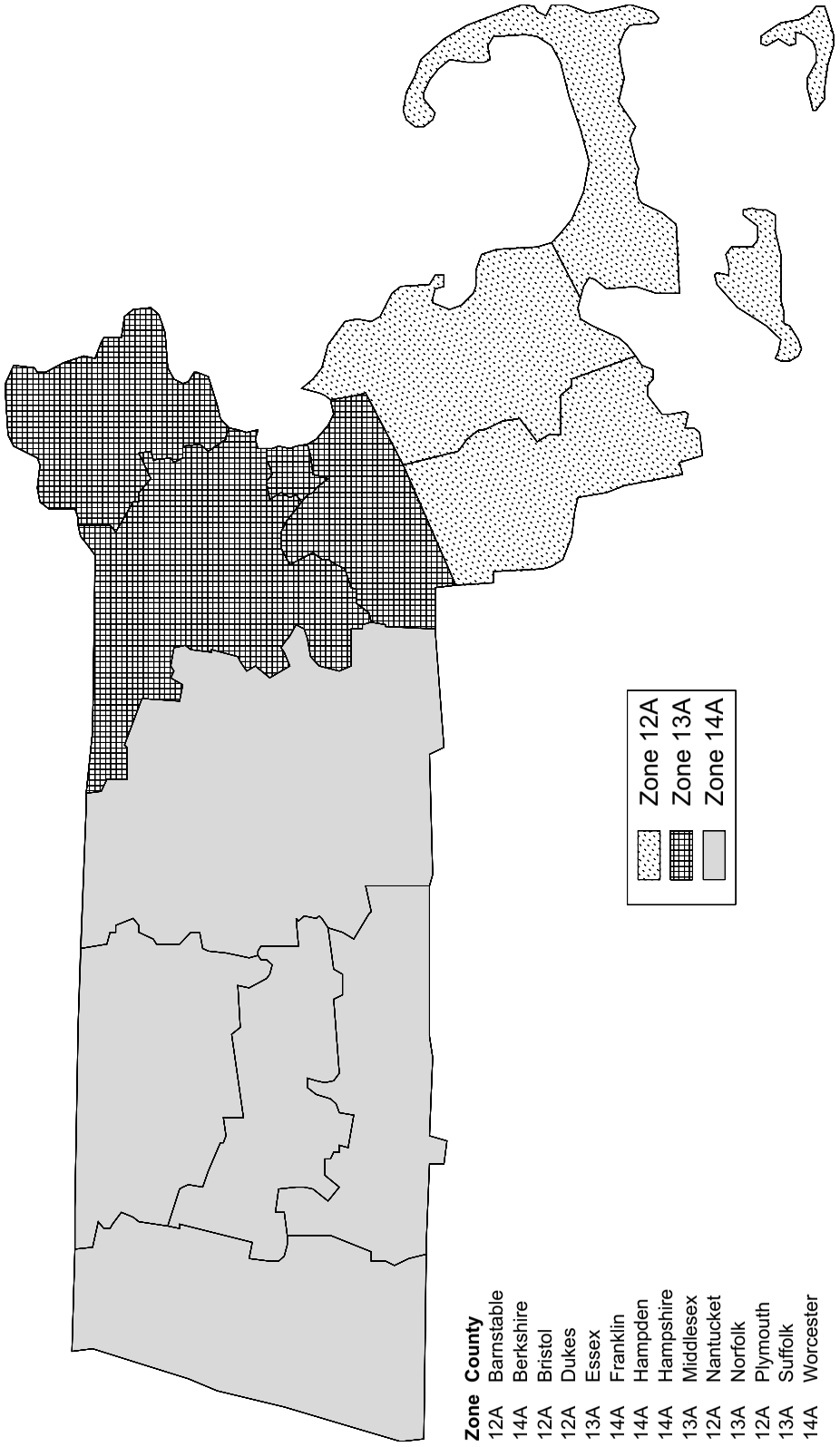


FIGURE 302.1(21)
MARYLAND



Zone	County
12A	Barnstable
14A	Berkshire
12A	Bristol
12A	Dukes
13A	Essex
14A	Franklin
14A	Hampden
14A	Hampshire
13A	Middlesex
12A	Nantucket
13A	Norfolk
12A	Plymouth
13A	Suffolk
14A	Worcester

FIGURE 302.1(22)
MASSACHUSETTS

Zone	County
15	Alcona
16	Alger
14A	Allegan
15	Alpena
15	Antrim
15	Arenac
17	Baraga
14A	Barry
15	Bay
15	Benzie
14A	Berrien
14A	Branch
14A	Calhoun
14A	Cass
15	Charlevoix
15	Cheboygan
16	Chippewa
15	Clare
14A	Clinton
15	Crawford
16	Delta
16	Dickinson
14A	Eaton
15	Emmet
4A	Genesee
15	Gladwin
17	Gogebic
15	Grand Traverse
14A	Gratiot
14A	Hillsdale
17	Houghton
14A	Huron
14A	Ingham
14A	Ionia
15	Iosco
17	Iron
15	Isabella
14A	Jackson
14A	Kalamazoo
15	Kalkaska
14A	Kent

Zone	County
17	Keweenaw
15	Lake
14A	Lapeer
15	Leelanau
14A	Lenawee
14A	Livingston
16	Luce
16	Mackinac
14A	Macomb
15	Manistee
16	Marquette
15	Mason
15	Mecosta
16	Menominee
15	Midland
15	Missaukee
13A	Monroe
14A	Montcalm
15	Montmorency
14A	Muskegon
15	Newaygo
14A	Oakland
15	Oceana
15	Ogemaw
17	Ontonagon
15	Osceola
15	Oscoda
15	Otsego
14A	Ottawa
15	Presque Isle
15	Roscommon
14A	Saginaw
14A	Sanilac
16	Schoolcraft
14A	Shiawassee
14A	St Clair
14A	St Joseph
14A	Tuscola
14A	Van Buren
13A	Washtenaw
13A	Wayne
15	Wexford

FIGURE 302.1(23)
MICHIGAN

FIGURE 302.1(24)
MINNESOTA

Zone	County	Zone	County
17	Aitkin	17	Marshall
16	Anoka	15	Martin
17	Becker	15	McLeod
17	Beltrami	16	Meeker
16	Benton	16	Mille Lacs
16	Big Stone	16	Morrison
15	Blue Earth	15	Mower
15	Brown	15	Murray
17	Carlton	15	Nicollet
15	Carver	15	Nobles
17	Cass	17	Norman
16	Chippewa	15	Olmsted
16	Chisago	17	Otter Tail
17	Clay	17	Pennington
17	Clearwater	16	Pine
17	Cook	15	Pipestone
15	Cottonwood	17	Polk
17	Crow Wing	16	Pope
15	Dakota	15	Ramsey
15	Dodge	17	Red Lake
16	Douglas	15	Redwood
15	Faribault	15	Renville
15	Fillmore	15	Rice
15	Freeborn	15	Rock
15	Goodhue	17	Roseau
16	Grant	15	Scott
15	Hennepin	16	Sherburne
15	Houston	15	Sibley
17	Hubbard	17	St Louis
16	Isanti	16	Stearns
17	Itasca	15	Steele
15	Jackson	16	Stevens
16	Kanabec	16	Swift
16	Kandiyohi	16	Todd
17	Kittson	16	Traverse
17	Koochiching	15	Wabasha
15	Lac Qui Parle	17	Wadena
17	Lake	15	Waseca
17	Lake Of The Woods	15	Washington
15	Le Sueur	15	Watonwan
15	Lincoln	17	Wilkin
15	Lyon	15	Winona
17	Mahnomen	16	Wright
		15	Yellow Medicine

Zone	County	Zone	County
5A	Adams (H)	6B	Leflore (H)
7B	Alcorn	5A	Lincoln (H)
4B	Amite (H)	6B	Lowndes (H)
6B	Attala (H)	6B	Madison (H)
7B	Benton	4B	Marion (H)
6B	Bolivar (H)	7B	Marshall
6B	Calhoun (H)	6B	Monroe (H)
6B	Carroll (H)	6B	Montgomery (H)
6B	Chickasaw (H)	6B	Neshoba (H)
6B	Choctaw (H)	6B	Newton (H)
5A	Claiborne (H)	6B	Noxubee (H)
5A	Clarke (H)	6B	Oktibbeha (H)
6B	Clay (H)	7B	Panola
7B	Coahoma	4B	Pearl River (H)
5A	Copiah (H)	5A	Perry (H)
5A	Covington (H)	4B	Pike (H)
7B	De Soto	7B	Pontotoc
5A	Forrest (H)	7B	Prentiss
5A	Franklin (H)	7B	Quitman
4B	George (H)	6B	Rankin (H)
5A	Greene (H)	6B	Scott (H)
6B	Grenada (H)	6B	Sharkey (H)
4B	Hancock (H)	5A	Simpson (H)
4B	Harrison (H)	5A	Smith (H)
6B	Hinds (H)	4B	Stone (H)
6B	Holmes (H)	6B	Sunflower (H)
6B	Humphreys (H)	7B	Tallahatchie
6B	Issaquena (H)	7B	Tate
7B	Itawamba	7B	Tippah
4B	Jackson (H)	7B	Tishomingo
5A	Jasper (H)	7B	Tunica
5A	Jefferson (H)	7B	Union
5A	Jefferson Davis (H)	4B	Walthall (H)
5A	Jones (H)	6B	Warren (H)
6B	Kemper (H)	6B	Washington (H)
7B	Lafayette	5A	Wayne (H)
4B	Lamar (H)	6B	Webster (H)
6B	Lauderdale (H)	4B	Wilkinson (H)
5A	Lawrence (H)	6B	Winston (H)
6B	Leake (H)	7B	Yalobusha
7B	Lee	6B	Yazoo (H)

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(25)
MISSISSIPPI[a]

Zone	County
12B	Adair
12B	Andrew
13B	Atchison
12B	Audrain
9B	Barry
10B	Barton
11B	Bates
11B	Benton
10B	Bollinger
11B	Boone
12B	Buchanan
9B	Butler
9B	Cape Girardeau
12B	Carroll
10B	Carter
11B	Cass
11B	Cedar
12B	Chariton
12B	Caldwell
11B	Callaway
11B	Camden
10B	Christian
13B	Clark
11B	Clay
12B	Clinton
11B	Cole
11B	Cooper
10B	Crawford
10B	Dade
10B	Dallas
12B	Daviess
12B	De Kalb
10B	Dent
10B	Douglas
9B	Dunklin
10B	Franklin
11B	Gasconade
13B	Gentry
10B	Greene
12B	Grundy
13B	Harrison
11B	Henry
11B	Hickory
12B	Holt
11B	Howard
9B	Howell
10B	Iron
11B	Jackson
9B	Jasper
10B	Jefferson
11B	Johnson
12B	Knox
10B	Laclede
11B	Lafayette
10B	Lawrence
12B	Lewis
11B	Lincoln
12B	Linn
12B	Livingston
12B	Macon
10B	Madison
11B	Maries
12B	Marion
9B	McDonald
13B	Mercer
11B	Miller
9B	Mississippi
11B	Moniteau
12B	Monroe
11B	Montgomery
11B	Morgan
9B	New Madrid
9B	Newton
13B	Nodaway
9B	Oregon
11B	Osage
9B	Ozark
9B	Pemiscot
10B	Perry
11B	Pettis
10B	Phelps
12B	Pike
11B	Platte
10B	Polk
10B	Pulaski
13B	Putnam
12B	Ralls
12B	Randolph
11B	Ray
10B	Reynolds
9B	Ripley
11B	Saline
13B	Schuyler
13B	Scotland
9B	Scott
10B	Shannon
12B	Shelby
10B	St Charles
11B	St Clair
10B	St Francois
10B	St Louis
10B	St Louis City
10B	Ste Genevieve
9B	Stoddard
9B	Stone
12B	Sullivan
9B	Taney
10B	Texas
11B	Vernon
11B	Warren
10B	Washington
10B	Wayne

FIGURE 302.1(26)
MISSOURI

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
15	Beaverhead	15	Custer	15	Garfield	15	Lewis And Clark	15	Missoula	16	Powell	16	Sheridan	16	Valley
15	Big Horn	16	Daniels	16	Glacier	16	Liberty	15	Musselshell	15	Prairie	16	Silver Bow	15	Wheatland
16	Blaine	15	Dawson	15	Golden Valley	15	Lincoln	15	Park	15	Ravalli	15	Stillwater	15	Wibaux
15	Broadwater	16	Deer Lodge	16	Granite	15	Madison	15	Petroleum	15	Richland	15	Sweet Grass	15	Yellowstone
15	Carbon	15	Fallon	16	Hill	15	McCone	16	Phillips	16	Roosevelt	15	Teton	15	Yellowstone National Park
15	Carter	15	Fergus	15	Jefferson	15	Meagher	16	Pondera	15	Rosebud	16	Toole		
15	Cascade	16	Flathead	15	Judith Basin	15	Mineral	15	Powder River	15	Sanders	15	Treasure		
15	Chouteau	15	Gallatin	15	Lake										

FIGURE 302.1(27)
MONTANA

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
13B	Adams	13B	Cass	14B	Deuel	13B	Gosper	13B	Johnson	13B	Merrick	13B	Polk	15	Sioux
14B	Antelope	14B	Cedar	14B	Dixon	14B	Grant	13B	Kearney	14B	Morrill	13B	Red Willow	14B	Stanton
14B	Arthur	13B	Chase	13B	Dodge	14B	Greeley	14B	Keith	13B	Nance	13B	Richardson	13B	Thayer
14B	Banner	14B	Cherry	13B	Douglas	13B	Hall	14B	Keya Paha	13B	Nemaha	14B	Rock	14B	Thomas
14B	Blaine	14B	Cheyenne	13B	Dundy	13B	Hamilton	14B	Kimball	13B	Nuckolls	13B	Saline	14B	Thurston
14B	Boone	13B	Clay	13B	Fillmore	13B	Harlan	14B	Knox	13B	Otoe	13B	Sarpy	14B	Valley
15	Box Butte	13B	Colfax	13B	Franklin	13B	Hayes	13B	Lancaster	13B	Pawnee	13B	Saunders	13B	Washington
14B	Boyd	14B	Cuming	13B	Frontier	13B	Hitchcock	14B	Lincoln	13B	Perkins	14B	Scotts Bluff	14B	Wayne
14B	Brown	14B	Custer	13B	Furnas	14B	Holt	14B	Logan	13B	Phelps	13B	Seward	13B	Webster
13B	Buffalo	14B	Dakota	13B	Gage	14B	Hooker	14B	Loup	14B	Pierce	15	Sheridan	14B	Wheeler
14B	Burt	15	Dawes	14B	Garden	14B	Howard	14B	Madison	13B	Platte	14B	Sherman	13B	York
13B	Butler	13B	Dawson	14B	Garfield	13B	Jefferson	14B	McPherson						

FIGURE 302.1(28)
NEBRASKA

Zone	County
12B	Carson City
12B	Churchill
5B	Clark
13B	Douglas
15	Elko
12B	Esmeralda
15	Eureka
13B	Humboldt
13B	Lander
12B	Lincoln
13B	Lyon
12B	Mineral
12B	Nye
12B	Pershing
12B	Storey
12B	Washoe
15	White Pine

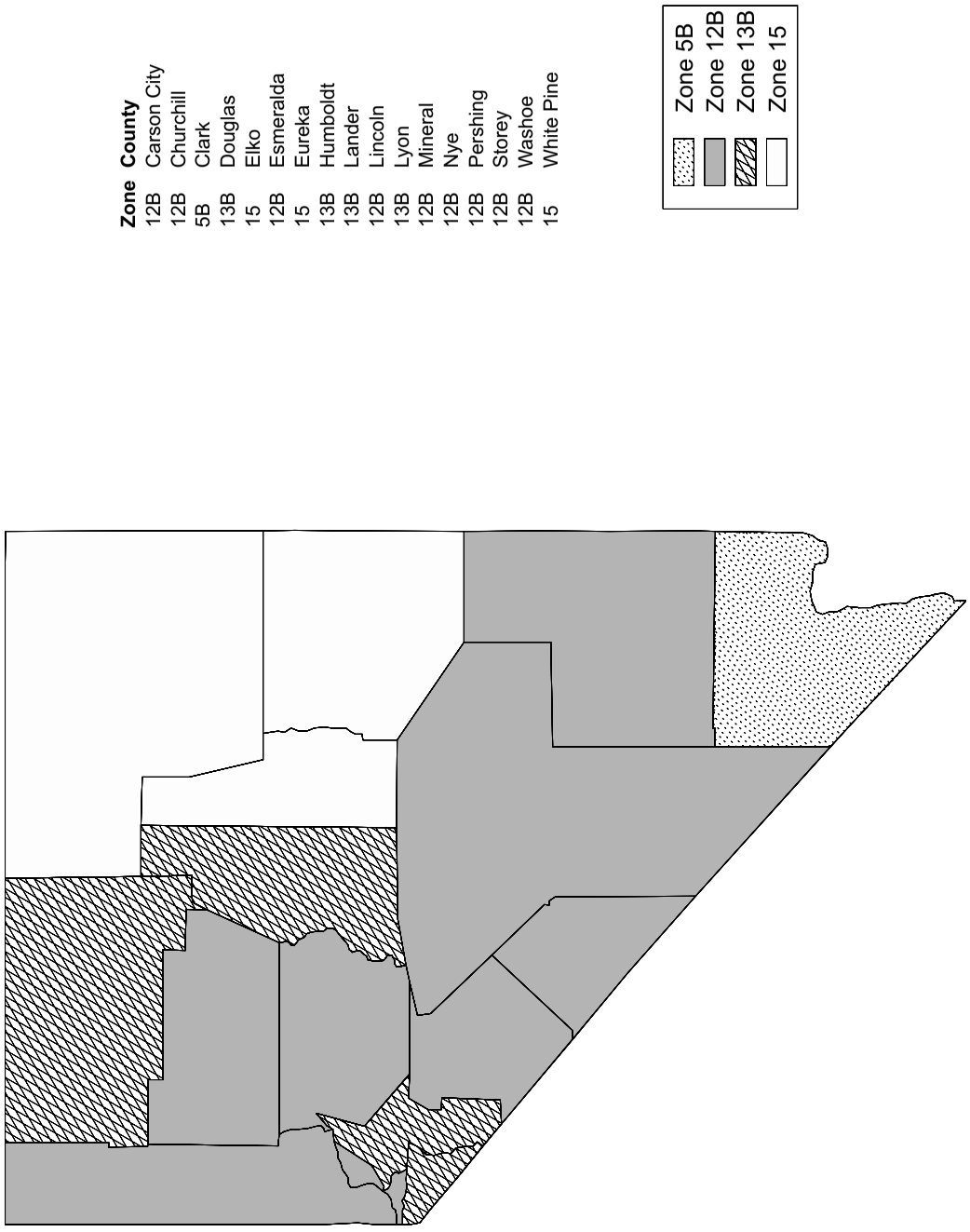


FIGURE 302.1(29)
NEVADA

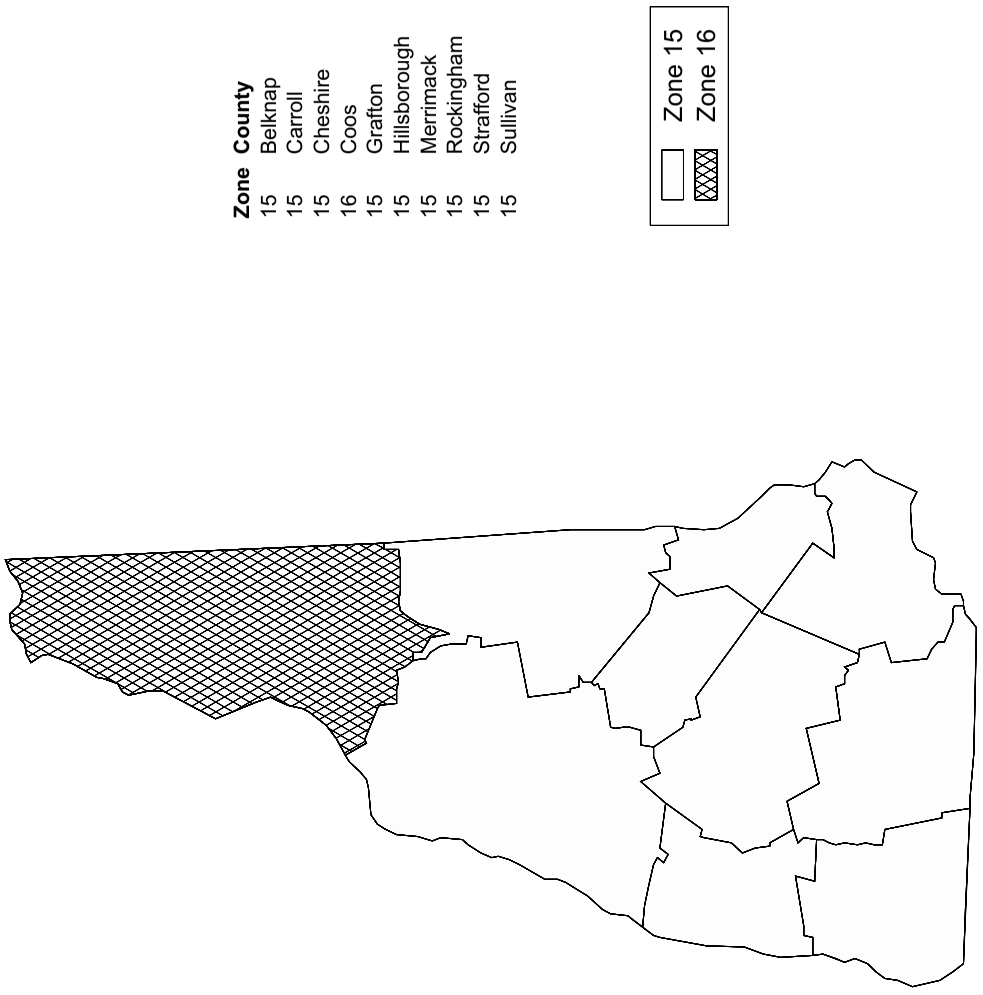


FIGURE 302.1(30)
NEW HAMPSHIRE

Zone	County
10B	Atlantic
12B	Bergen
11B	Burlington
10B	Camden
10B	Cape May
10B	Cumberland
11B	Essex
10B	Gloucester
11B	Hudson
12B	Hunterdon
11B	Mercer
11B	Middlesex
11B	Monmouth
12B	Morris
11B	Ocean
12B	Passaic
10B	Salem
12B	Somerset
13A	Sussex
11B	Union
12B	Warren

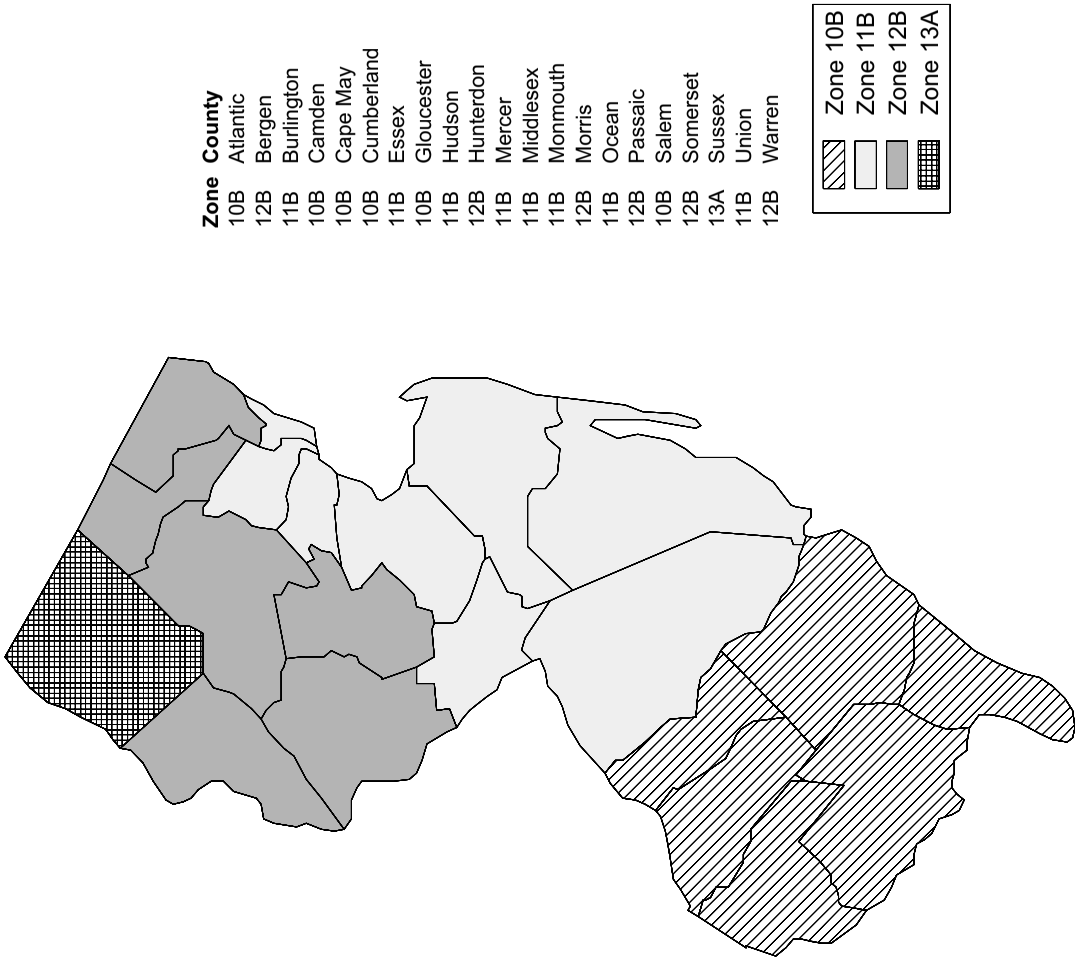


FIGURE 302.1(31)
NEW JERSEY

Zone	County	Zone	County
9B	Bernalillo	13B	Mckinley
11B	Catron	15	Mora
7B	Chaves	7A	Otero
12B	Cibola	8	Quay
13B	Colfax	12B	Rio Arriba
9B	Curry	8	Roosevelt
9B	De Baca	12B	San Juan
7A	Dona Ana	12B	San Miguel
7B	Eddy	13B	Sandoval
9B	Grant	13B	Santa Fe
9B	Guadalupe	8	Sierra
11B	Harding	9B	Socorro
7A	Hidalgo	15	Taos
7B	Lea	11B	Torrance
9B	Lincoln	11B	Union
13B	Los Alamos	10B	Valencia
7A	Luna		

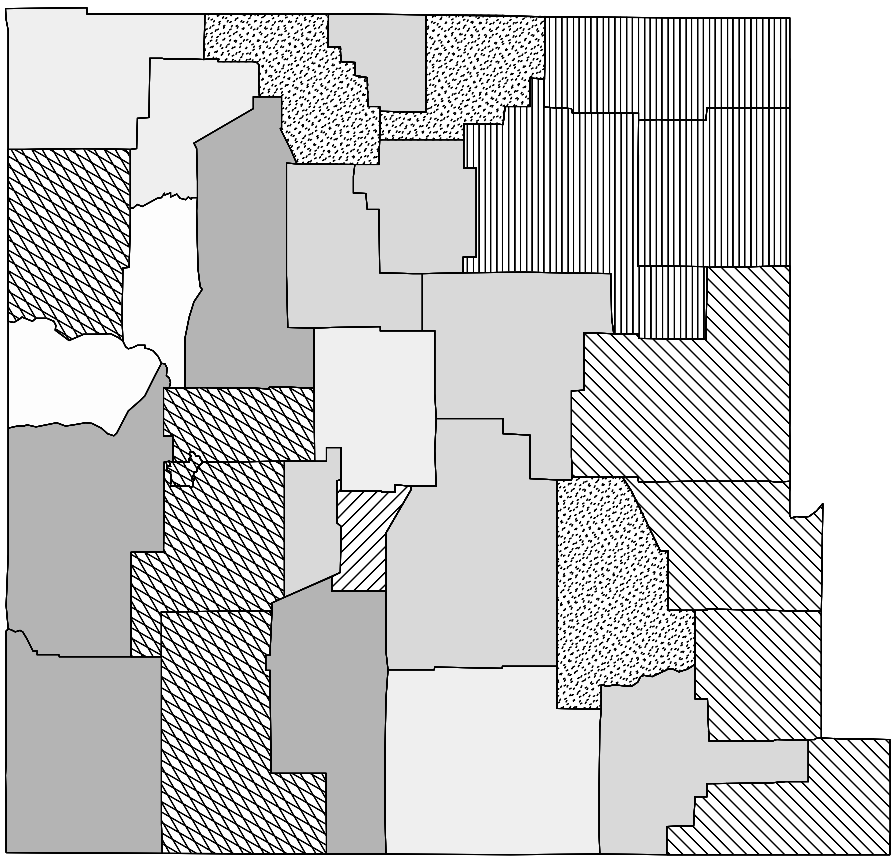


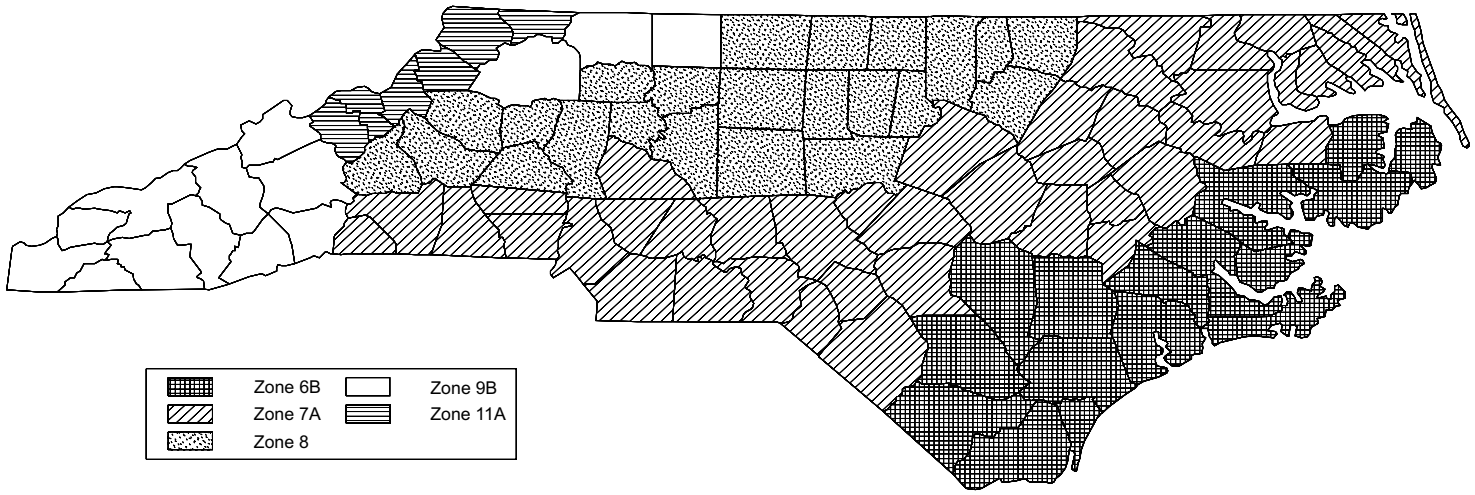
FIGURE 302.1(32)
NEW MEXICO

Zone	County
14A	Albany
15	Allegany
11B	Bronx
15	Broome
15	Cattaraugus
14A	Cayuga
14A	Chautauqua
15	Chemung
15	Chenango
15	Clinton
14A	Columbia
15	Cortland
15	Delaware
13A	Dutchess
14A	Erie
16	Essex
16	Franklin
15	Fulton
14A	Genesee
14A	Greene
16	Hamilton
15	Herkimer
15	Jefferson
10B	Kings
15	Lewis
14A	Livingston
14A	Madison
14A	Monroe
14A	Montgomery
11B	Nassau
10B	New York

Zone	County
14A	Niagara
15	Oneida
14A	Onondaga
14A	Ontario
12B	Orange
14A	Orleans
14A	Oswego
15	Otsego
12B	Putnam
10B	Queens
14A	Rensselaer
11B	Richmond
12B	Rockland
14A	Saratoga
14A	Schenectady
15	Schoharie
15	Schuyler
14A	Seneca
15	St Lawrence
15	Steuben
11B	Suffolk
15	Sullivan
15	Tioga
15	Tompkins
15	Ulster
15	Warren
15	Washington
14A	Wayne
12B	Westchester
14A	Wyoming
14A	Yates

FIGURE 302.1(33)
NEW YORK

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
8	Alamance	8	Caldwell	7A	Currituck	7A	Greene	7A	Lee	6B	New Hanover (H)	7A	Richmond	6B	Tyrrell (H)
8	Alexander	7A	Camden	6B	Dare (H)	8	Guilford	7A	Lenoir	7A	Northampton	7A	Robeson	7A	Union
11A	Alleghany	6B	Carteret (H)	8	Davidson	7A	Halifax	7A	Lincoln	6B	Onslow (H)	8	Rockingham	8	Vance
7A	Anson	8	Caswell	8	Davie	7A	Harnett	9B	Macon	8	Orange	7A	Rowan	7A	Wake
11A	Ashe	8	Catawba	6B	Duplin (H)	9B	Haywood	9B	Madison	6B	Pamlico (H)	7A	Rutherford	8	Warren
11A	Avery	8	Chatham	8	Durham	9B	Henderson	7A	Martin	7A	Pasquotank	6B	Sampson (H)	7A	Washington
6B	Beaufort (H)	9B	Cherokee	7A	Edgecombe	7A	Hertford	8	McDowell	6B	Pender (H)	7A	Scotland	11A	Watauga
7A	Bertie	7A	Chowan	8	Forsyth	7A	Hoke	7A	Mecklenburg	7A	Perquimans	7A	Stanly	7A	Wayne
6B	Bladen (H)	9B	Clay	8	Franklin	6B	Hyde (H)	11A	Mitchell	8	Person	9B	Stokes	9B	Wilkes
6B	Brunswick (H)	7A	Cleveland	7A	Gaston	8	Iredell	7A	Montgomery	7A	Pitt	9B	Surry	7A	Wilson
9B	Buncombe	6B	Columbus (H)	7A	Gates	9B	Jackson	7A	Moore	7A	Polk	9B	Swain	8	Yadkin
8	Burke	6B	Craven (H)	9B	Graham	7A	Johnston	7A	Nash	8	Randolph	9B	Transylvania	11A	Yancey
7A	Cabarrus	7A	Cumberland	8	Granville	6B	Jones (H)								



a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(34)
NORTH CAROLINA[a]

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
16	Adams	16	Burleigh	16	Emmons	17	Kidder	16	Mercer	17	Ramsey	17	Sheridan	17	Towner
17	Barnes	17	Cass	17	Foster	16	La Moure	16	Morton	16	Ransom	16	Sioux	17	Traill
17	Benson	17	Cavalier	16	Golden Valley	16	Logan	17	Mountrail	17	Renville	16	Slope	17	Walsh
16	Billings	16	Dickey	17	Grand Forks	17	McHenry	17	Nelson	16	Richland	16	Stark	17	Ward
17	Bottineau	17	Divide	16	Grant	16	McIntosh	16	Oliver	17	Rolette	17	Steele	17	Wells
16	Bowman	16	Dunn	17	Griggs	16	McKenzie	17	Pembina	16	Sargent	17	Stutsman	17	Williams
17	Burke	17	Eddy	16	Hettinger	17	McLean	17	Pierce						

FIGURE 302.1(35)
NORTH DAKOTA

Zone	County
11B	Adams
13B	Allen
13A	Ashland
13A	Ashtabula
11B	Athens
13B	Auglaize
12A	Belmont
11B	Brown
12B	Butler
13A	Carroll
13A	Champaign
13A	Clark
11B	Clermont
12B	Clinton
13A	Columbiana
12B	Coshocton
13A	Crawford
13A	Cuyahoga
13A	Darke
14A	Defiance
13A	Delaware
13A	Erie
12A	Fairfield
12B	Fayette
12B	Franklin
14A	Fulton
11B	Gallia
13A	Geauga
12B	Greene
12B	Guernsey
11B	Hamilton
13A	Hancock
13A	Hardin
13A	Harrison
14A	Henry
11B	Highland
12A	Hocking
13A	Holmes
13A	Huron
11B	Jackson
13A	Jefferson
13A	Knox
13A	Lake
11B	Lawrence
12B	Licking
13A	Logan
13A	Lorain
14A	Lucas
12B	Madison
13A	Mahoning
13A	Marion
13A	Medina
11B	Meigs
13B	Mercer
13A	Miami
12A	Monroe
12B	Montgomery
12A	Morgan
13A	Morrow
12B	Muskingum
12A	Noble
13A	Ottawa
14A	Paulding
12A	Perry
12B	Pickaway
11B	Pike
13A	Portage
12B	Preble
13B	Putnam
13A	Richland
12B	Ross
13A	Sandusky
11B	Scioto
13A	Seneca
13A	Shelby
13A	Stark
13A	Summit
13A	Trumbull
13A	Tuscarawas
13A	Union
13B	Van Wert
11B	Vinton
12B	Warren
11B	Washington
13A	Wayne
14A	Williams
14A	Wood
13A	Wyandot

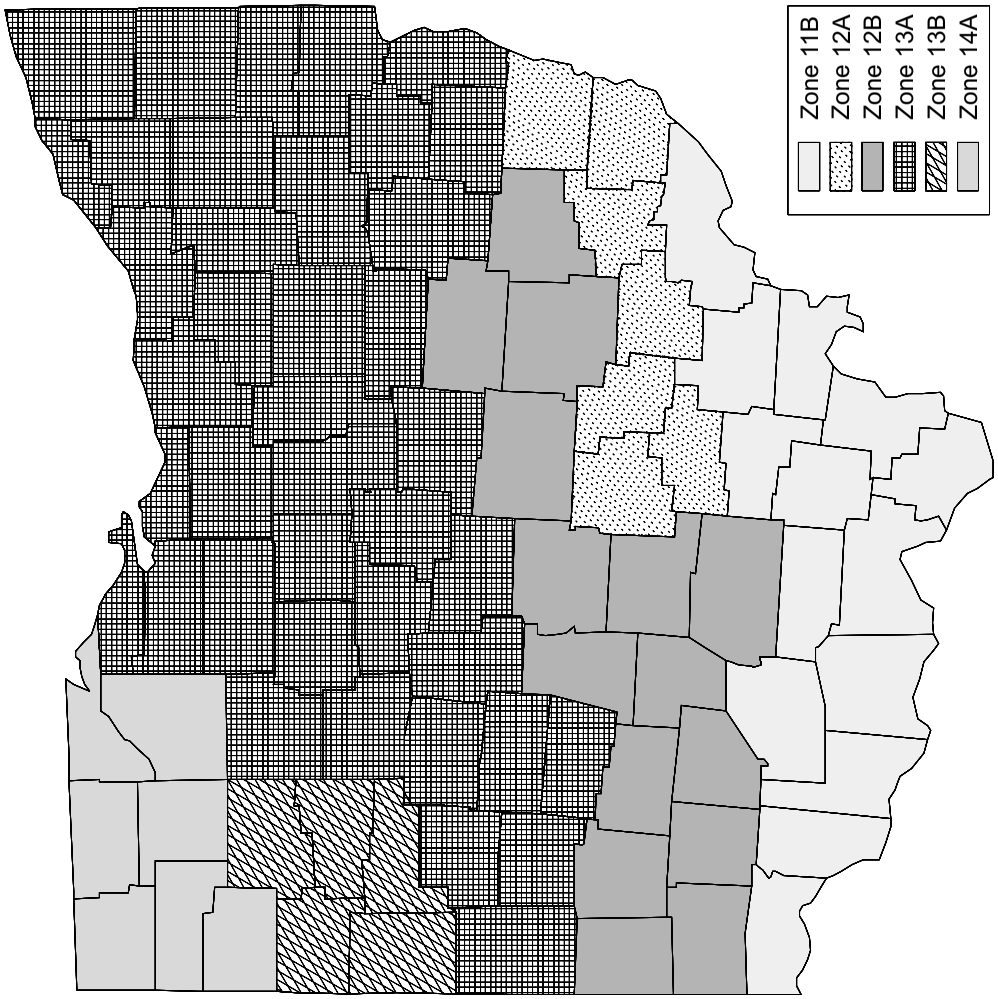


FIGURE 302.1(36)
OHIO

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
8	Adair	8	Cherokee	8	Delaware	7B	Haskell	7B	Lincoln	7B	Muskogee	8	Payne	7B	Stephens
9B	Alfalfa	6B	Choctaw (H)	9B	Dewey	7B	Hughes	8	Logan	8	Noble	7B	Pittsburg	10B	Texas
7B	Atoka	10B	Cimarron	9B	Ellis	7B	Jackson	6B	Love (H)	9B	Nowata	7B	Pontotoc	7B	Tillman
10B	Beaver	7B	Cleveland	8	Garfield	6B	Jefferson (H)	9B	Major	7B	Okfuskee	7B	Pottawatomie	8	Tulsa
8	Beckham	7B	Coal	7B	Garvin	6B	Johnston (H)	6B	Marshall (H)	8	Oklahoma	6B	Pushmataha (H)	8	Wagoner
8	Blaine	7B	Comanche	7B	Grady	9B	Kay	8	Mayes	8	Okmulgee	9B	Roger Mills	9B	Washington
7B	Bryan	7B	Cotton	9B	Grant	8	Kingfisher	7B	McClain	8	Osage	9B	Rogers	8	Washita
8	Caddo	9B	Craig	7B	Greer	7B	Kiowa	7B	McCurtain	9B	Ottawa	7B	Seminole	9B	Woods
8	Canadian	8	Creek	7B	Harmon	7B	Latimer	7B	McIntosh	8	Pawnee	7B	Sequoyah	9B	Woodward
6B	Carter (H)	8	Custer	9B	Harper	7B	Le Flore	7B	Murray						

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(37)
OKLAHOMA[a]

Zone	County
15	Baker
10A	Benton
10A	Clackamas
11A	Clatsop
11A	Columbia
9A	Coos
14A	Crook
9A	Curry
14A	Deschutes
9A	Douglas
12A	Gilliam
15	Grant
15	Harney
12A	Hood River
11A	Jackson
13B	Jefferson
9A	Josephine
14A	Klamath
15	Lake
10A	Lane
11A	Lincoln
10A	Linn
12B	Malheur
10A	Marion
12A	Morrow
10A	Multnomah
10A	Polk
13B	Sherman
11A	Tillamook
12A	Umatilla
13B	Union
15	Wallowa
13B	Wasco
10A	Washington
13B	Wheeler
10A	Yamhill

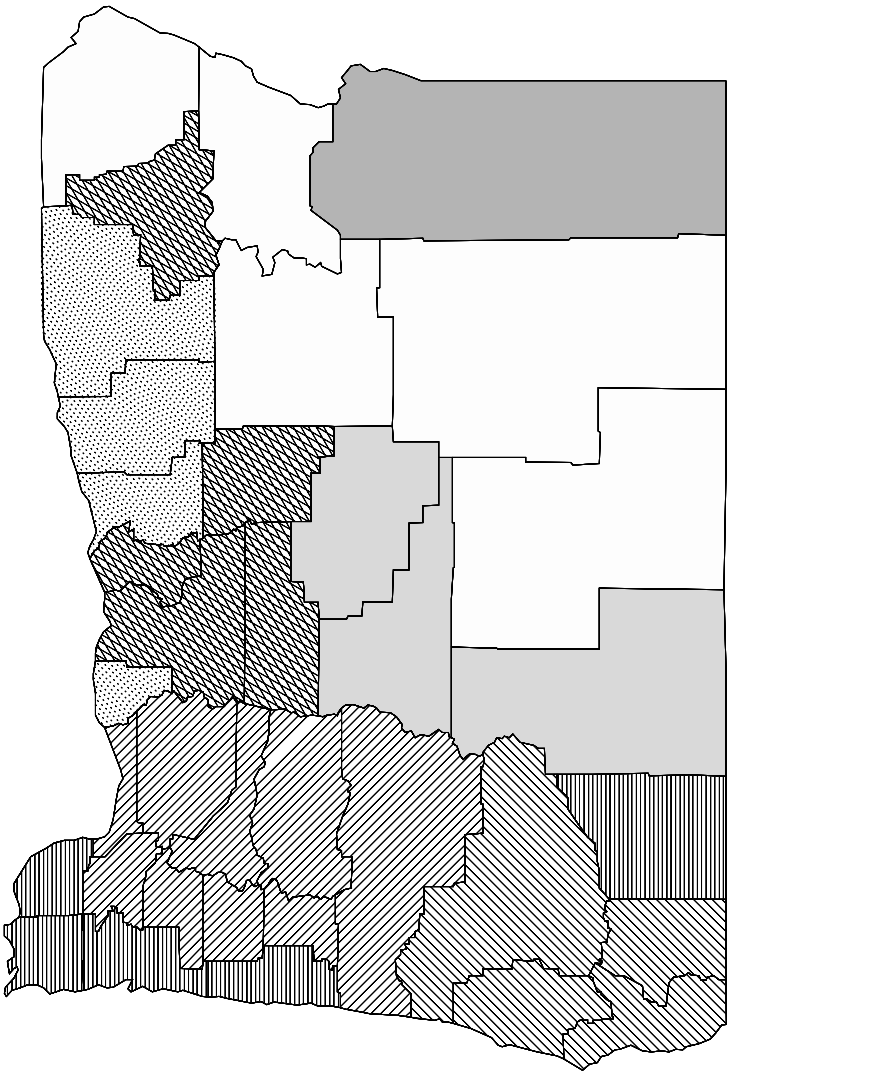


FIGURE 302.1(38)
OREGON

Zone	County
11B	Adams
12A	Allegheny
13B	Armstrong
12A	Beaver
13B	Bedford
12B	Berks
13B	Blair
15	Bradford
11B	Bucks
14A	Butler
13B	Cambria
15	Cameron
13B	Carbon
13B	Centre
11B	Chester
14A	Clarion
15	Clearfield
13B	Clinton
13B	Columbia
14A	Crawford
12B	Cumberland
12B	Dauphin
10B	Delaware
15	Elk
14A	Erie
12A	Fayette
15	Forest
11B	Franklin
12B	Fulton
12A	Greene
12B	Huntingdon
13B	Indiana
15	Jefferson
12B	Juniata
14A	Lackawanna
11B	Lancaster
14A	Lawrence
12B	Lebanon
12B	Lehigh
13B	Luzerne
13B	Lycoming
15	McKean
14A	Mercer
12B	Mifflin
13B	Monroe
11B	Montgomery
13B	Montour
12B	Northampton
13B	Northumberland
12B	Perry
10B	Philadelphia
13B	Pike
15	Potter
13B	Schuylkill
13B	Snyder
13B	Somerset
14A	Sullivan
15	Susquehanna
15	Tioga
13B	Union
14A	Venango
14A	Warren
12A	Washington
15	Wayne
13B	Westmoreland
14A	Wyoming
11B	York

FIGURE 302.1(39)
PENNSYLVANIA

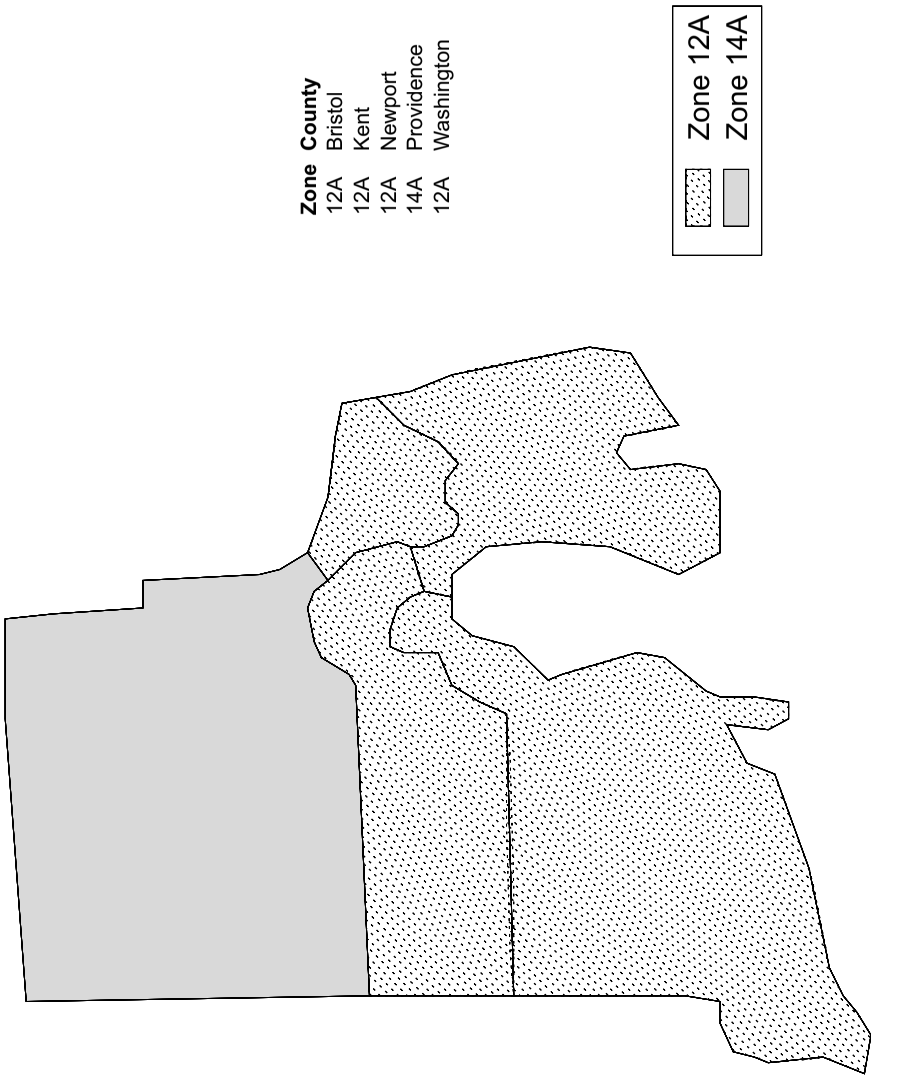


FIGURE 302.1(40)
RHODE ISLAND

Zone	County	Zone	County
7A	Abbeville	7A	Greenwood
6B	Aiken (H)	5A	Hampton (H)
5A	Allendale (H)	5A	Horry (H)
7A	Anderson	5A	Jasper (H)
5A	Bamberg (H)	7A	Kershaw
5A	Barnwell (H)	7A	Lancaster
5A	Beaufort (H)	7A	Laurens
5A	Berkeley (H)	6B	Lee (H)
6B	Calhoun (H)	6B	Lexington (H)
5A	Charleston (H)	6B	Marion (H)
7A	Cherokee	6B	Marlboro (H)
7A	Chester	6B	McCormick (H)
7A	Chesterfield	6B	Newberry (H)
6B	Clarendon (H)	7A	Oconee
5A	Colleton (H)	6B	Orangeburg (H)
6B	Darlington (H)	7A	Pickens
6B	Dillon (H)	6B	Richland (H)
5A	Dorchester (H)	6B	Saluda (H)
6B	Edgefield (H)	7A	Spartanburg
7A	Fairfield	6B	Sumter (H)
6B	Florence (H)	7A	Union
5A	Georgetown (H)	6B	Williamsburg (H)
7A	Greenville	7A	York

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(41)
SOUTH CAROLINA[a]

Zone	County
15	Aurora
15	Beadle
14B	Bennett
14B	Bon Homme
16	Brookings
16	Brown
15	Brule
15	Buffalo
15	Butte
15	Campbell
14B	Charles Mix
16	Clark
14B	Clay
16	Codington
15	Corson
15	Custer
15	Davison
16	Day
16	Deuel
15	Dewey
14B	Douglas
15	Edmunds
15	Fall River
15	Faulk
16	Grant
14B	Gregory
15	Haakon
16	Hamlin
15	Hand
15	Hanson
15	Harding
15	Hughes
14B	Hutchinson
15	Hyde
14B	Jackson
15	Jerauld
15	Jones
15	Kingsbury
15	Lake
15	Lawrence
15	Lincoln
15	Lyman
16	Marshall
15	McCook
16	McPherson
15	Meade
14B	Mellette
15	Miner
15	Minnehaha
15	Moody
15	Pennington
15	Perkins
15	Potter
16	Roberts
15	Sanborn
15	Shannon
15	Spink
15	Stanley
15	Sully
14B	Todd
14B	Tripp
15	Turner
14B	Union
15	Walworth
14B	Yankton
15	Ziebach

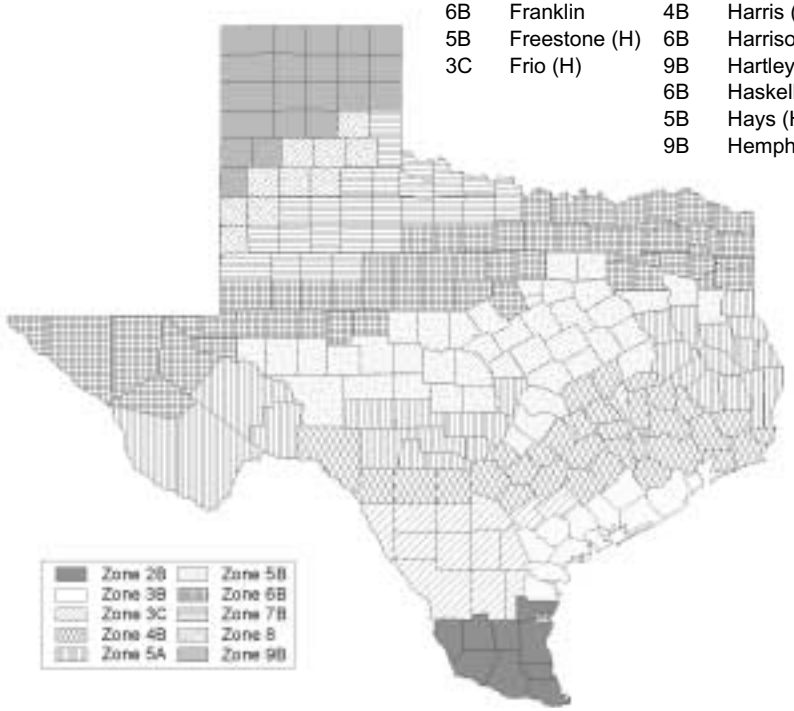
FIGURE 302.1(42)
SOUTH DAKOTA

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
9B	Anderson	10B	Claiborne	10B	Fentress	9B	Hawkins	8	Lauderdale	8	Meigs	9B	Roane	9B	Trousdale
8	Bedford	9B	Clay	8	Franklin	8	Haywood	8	Lawrence	8	Monroe	9B	Robertson	10B	Unicoi
9B	Benton	9B	Cocke	9B	Gibson	8	Henderson	8	Lewis	9B	Montgomery	8	Rutherford	9B	Union
8	Bledsoe	8	Coffee	8	Giles	9B	Henry	8	Lincoln	8	Moore	10B	Scott	9B	Van Buren
8	Blount	8	Crockett	9B	Grainger	9B	Hickman	8	Loudon	10B	Morgan	8	Sequatchie	9B	Warren
8	Bradley	9B	Cumberland	9B	Greene	9B	Houston	9B	Macon	9B	Obion	9B	Sevier	9B	Washington
10B	Campbell	8	Davidson	9B	Grundy	9B	Humphreys	8	Madison	9B	Overton	7B	Shelby (H)	8	Wayne
9B	Cannon	9B	De Kalb	9B	Hamblen	9B	Jackson	8	Marion	8	Perry	9B	Smith	9B	Weakley
9B	Carroll	8	Decatur	8	Hamilton	9B	Jefferson	8	Marshall	10B	Pickett	9B	Stewart	9B	White
10B	Carter	9B	Dickson	10B	Hancock	10B	Johnson	9B	Maury	8	Polk	9B	Sullivan	8	Williamson
9B	Cheatham	8	Dyer	8	Hardeman	8	Knox	8	McMinn	9B	Putnam	9B	Sumner	9B	Wilson
8	Chester	7B	Fayette (H)	8	Hardin	9B	Lake	8	McNairy	8	Rhea	8	Tipton		

a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(43)
TENNESSEE[a]

Zone	County
5A	Anderson (H)
6B	Andrews
5A	Angelina (H)
3B	Aransas (H)
7B	Archer
9B	Armstrong
3C	Atascosa (H)
4B	Austin (H)
9B	Bailey
5A	Bandera (H)
4B	Bastrop (H)
7B	Baylor
3B	Bee (H)
5B	Bell (H)
4B	Bexar (H)
5A	Blanco (H)
7B	Borden
5B	Bosque (H)
6B	Bowie
3B	Brazoria (H)
4B	Brazos (H)
5A	Brewster (H)
8	Briscoe
2B	Brooks (H)
5B	Brown (H)
4B	Burleson (H)
5A	Burnet (H)
4B	Caldwell (H)
3B	Calhoun (H)
6B	Callahan
2B	Cameron (H)
6B	Camp
9B	Carson
6B	Cass
9B	Castro
4B	Chambers (H)
5A	Cherokee (H)
7B	Childress
7B	Clay
8	Cochran
6B	Coke
5B	Coleman (H)
6B	Collin
7B	Collingsworth
4B	Colorado (H)
4B	Comal (H)
5B	Comanche (H)
5B	Concho (H)
6B	Cooke
5B	Coryell (H)
7B	Cottle
5B	Crane (H)
5B	Crockett (H)
7B	Crosby
6B	Culberson
9B	Dallam
5B	Dallas (H)
7B	Dawson
3C	De Witt (H)
9B	Deaf Smith
6B	Delta
6B	Denton
7B	Dickens
3C	Dimmit (H)
8	Donley
3C	Duval (H)
6B	Eastland
6B	Ector
5A	Edwards (H)
6B	El Paso
5B	Ellis (H)
6B	Erath
5B	Falls (H)
6B	Fannin
4B	Fayette (H)
6B	Fisher
8	Floyd
7B	Foard
4B	Fort Bend (H)
6B	Franklin
5B	Freestone (H)
3C	Frio (H)
7B	Gaines
3B	Galveston (H)
7B	Garza
5A	Gillespie (H)
6B	Glasscock
3B	Goliad (H)
4B	Gonzales (H)
9B	Gray
6B	Grayson
6B	Gregg
4B	Grimes (H)
4B	Guadalupe (H)
8	Hale
8	Hall
5B	Hamilton (H)
9B	Hansford
7B	Hardeman
4B	Hardin (H)
4B	Harris (H)
6B	Harrison
9B	Hartley
6B	Haskell
5B	Hays (H)
9B	Hemphill
5B	Henderson (H)
2B	Hidalgo (H)
5B	Hill (H)
8	Hockley
5B	Hood (H)
6B	Hopkins
5A	Houston (H)
6B	Howard
6B	Hudspeth
6B	Hunt
9B	Hutchinson
5B	Irion (H)
6B	Jack
3B	Jackson (H)
5A	Jasper (H)
6B	Jeff Davis
4B	Jefferson (H)
2B	Jim Hogg (H)
3C	Jim Wells (H)
5B	Johnson (H)
6B	Jones
3C	Karnes (H)
6B	Kaufman
5A	Kendall (H)
2B	Kenedy (H)
7B	Kent
5A	Kerr (H)
5A	Kimble (H)
7B	King
4B	Kinney (H)
2B	Kleberg (H)
7B	Knox
3C	La Salle (H)
6B	Lamar
8	Lamb
5B	Lampasas (H)
4B	Lavaca (H)
4B	Lee (H)
5B	Leon (H)
4B	Liberty (H)
5B	Limestone (H)
9B	Lipscomb
3C	Live Oak (H)
5B	Llano (H)
6B	Loving
7B	Lubbock
7B	Lynn
4B	Madison (H)
6B	Marion
6B	Martin
5B	Mason (H)
3B	Matagorda (H)
3C	Maverick (H)
5B	McCulloch (H)
5B	McLennan (H)
3C	McMullen (H)
4B	Medina (H)
5B	Menard (H)
6B	Midland (H)
4B	Milam (H)
5B	Mills (H)
6B	Mitchell
6B	Montague
4B	Montgomery (H)
9B	Moore
6B	Morris
7B	Motley
5A	Nacogdoches (H)
5B	Navarro (H)
5A	Newton (H)
6B	Nolan
3B	Nueces (H)
9B	Ochiltree
9B	Oldham
4B	Orange (H)
6B	Palo Pinto
5A	Panola (H)
6B	Parker
9B	Parmer
5A	Pecos (H)
5A	Polk (H)
9B	Potter
5A	Presidio (H)
6B	Rains
9B	Randall
5B	Reagan (H)
5A	Real (H)
6B	Red River
6B	Reeves
3B	Refugio (H)
9B	Roberts
4B	Robertson (H)
6B	Rockwall
5B	Runnels (H)
5B	Rusk (H)
5A	Sabine (H)
5A	San Augustine (H)
4B	San Jacinto (H)
3C	San Patricio (H)
5B	San Saba (H)
5B	Schleicher (H)
7B	Scurry
6B	Shackelford
5A	Shelby (H)
9B	Sherman
5B	Smith (H)
5B	Somervell (H)
2B	Starr (H)
6B	Stephens
6B	Sterling
7B	Stonewall
5A	Sutton (H)
8	Swisher
5B	Tarrant (H)
6B	Taylor
5A	Terrell (H)
7B	Terry
6B	Throckmorton
6B	Titus
5B	Tom Green (H)
5B	Travis (H)
5A	Trinity (H)
5A	Tyler (H)
6B	Upshur
5B	Upton (H)
4B	Uvalde (H)
4B	Val Verde (H)
6B	Van Zandt
3B	Victoria (H)
4B	Walker (H)
4B	Waller (H)
6B	Ward
4B	Washington (H)
3C	Webb (H)
3B	Wharton (H)
9B	Wheeler
7B	Wichita
7B	Wilbarger
2B	Willacy (H)
5B	Williamson (H)
4B	Wilson (H)
6B	Winkler
6B	Wise
6B	Wood
8	Yoakum
6B	Young
2B	Zapata (H)
3C	Zavala (H)



a. Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

FIGURE 302.1(44)
TEXAS[a]

Zone	County
14B	Beaver
12B	Box Elder
15	Cache
14B	Carbon
15	Daggett
12B	Davis
15	Duchesne
14B	Emery
14B	Garfield
10B	Grand
12B	Iron
12B	Juab
10B	Kane
13B	Millard
15	Morgan
13B	Piute
15	Rich
12B	Salt Lake
13B	San Juan
14B	Sanpete
13B	Sevier
15	Summit
12B	Tooele
15	Uintah
12B	Utah
15	Wasatch
10B	Washington
14B	Wayne
12B	Weber

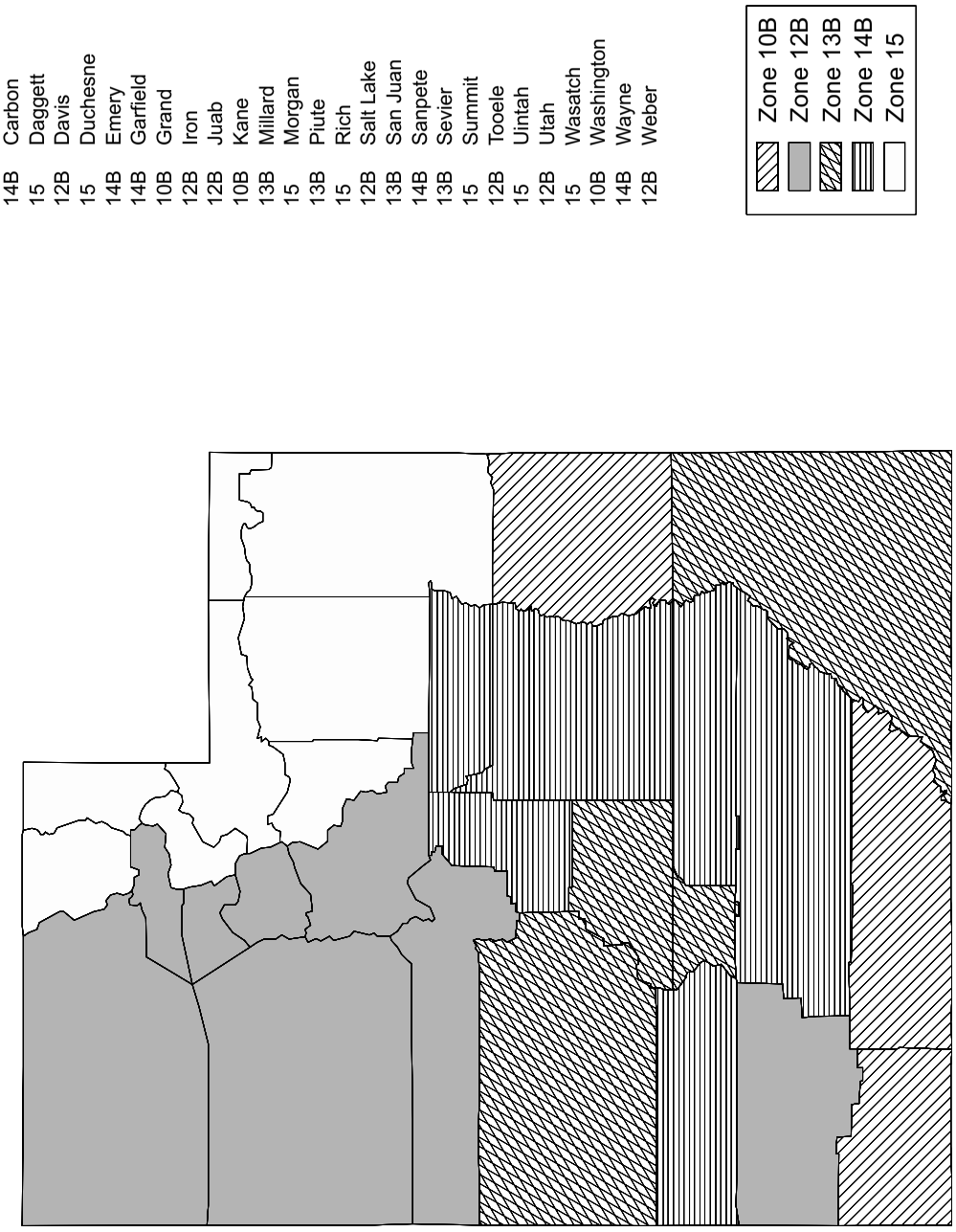


FIGURE 302.1(45)
UTAH

Zone	County
15	Addison
15	Bennington
16	Caledonia
15	Chittenden
16	Essex
15	Franklin
15	Grand Isle
16	Lamoille
16	Orange
16	Orleans
15	Rutland
16	Washington
15	Windham
15	Windsor

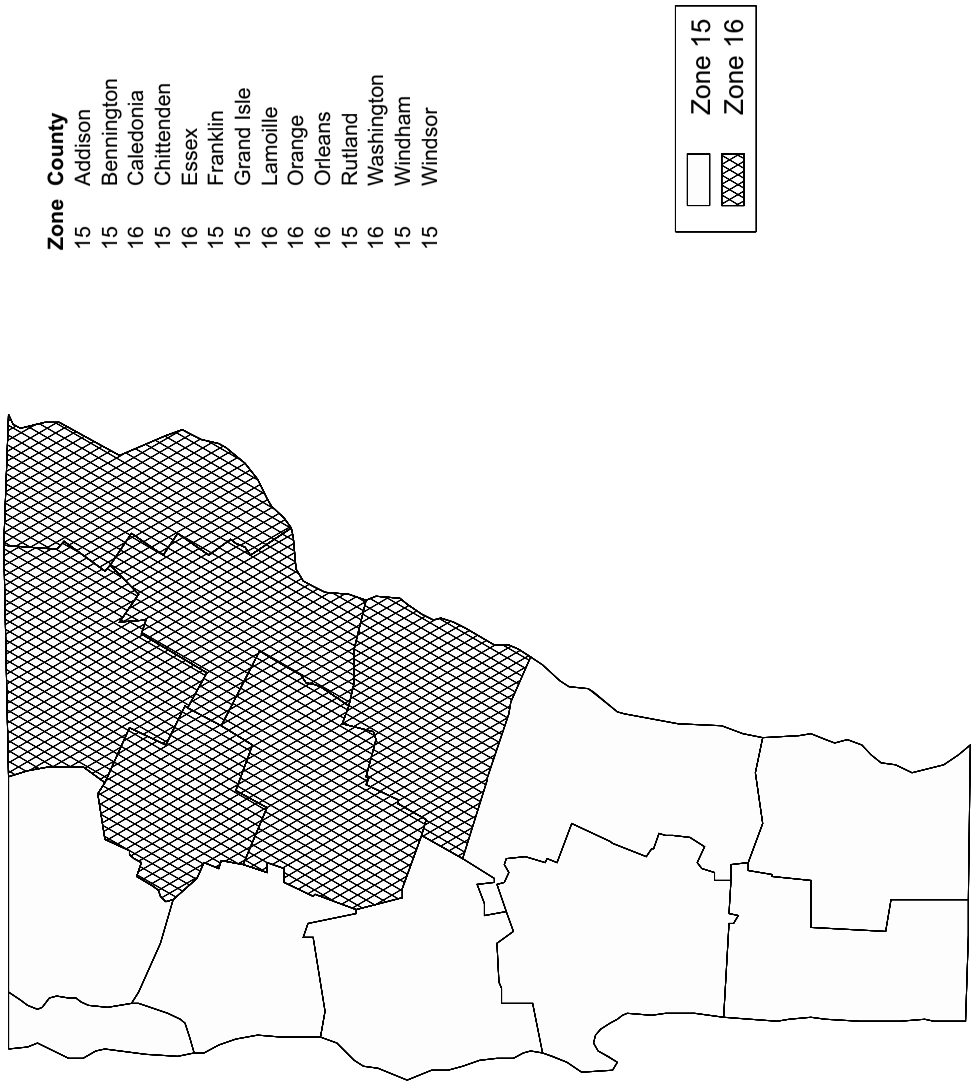
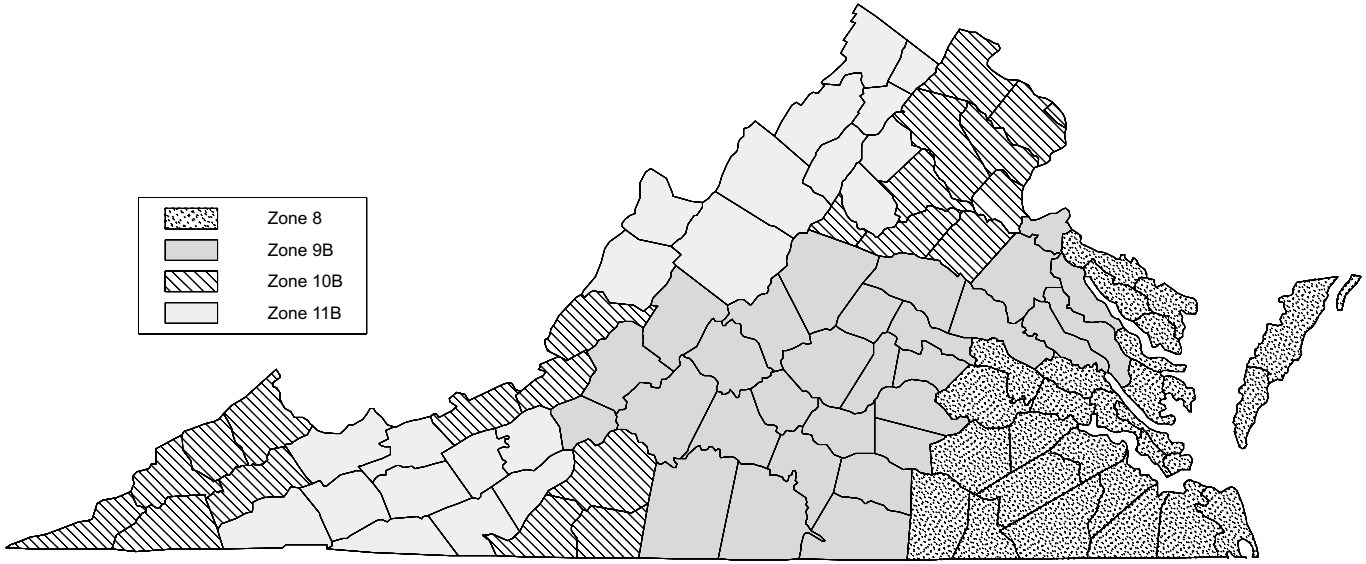


FIGURE 302.1(46)
VERMONT

Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County	Zone	County
8	Accomack	9B	Campbell	11B	Floyd	8	Isle Of Wight	11B	Montgomery	10B	Orange	10B	Prince William	10B	Scott
9B	Albemarie	9B	Caroline	9B	Fluvanna	8	James City	8	Nansemond	11B	Page	11B	Pulaski	11B	Shenandoah
10B	Alleghany	11B	Carroll	10B	Franklin	9B	King And Queen	9B	Nelson	10B	Patrick	11B	Rappahannock	11B	Smyth
9B	Amelia	8	Charles City	11B	Frederick	9B	King George	8	New Kent	9B	Pittsylvania	8	Richmond	8	Southampton
9B	Amherst	9B	Charlotte	10B	Giles	9B	King William	8	Northampton	9B	Powhatan	9B	Roanoke	10B	Spotsylvania
9B	Appomattox	8	Chesterfield	8	Gloucester	8	Lancaster	8	Northumberland	9B	Prince Edward	9B	Rockbridge	10B	Stafford
10B	Arlington	11B	Clarke	9B	Goochland	10B	Lee	9B	Nottoway	8	Prince George	11B	Rockingham	8	Surry
11B	Augusta	10B	Craig	11B	Grayson	10B	Loudoun					10B	Russell	8	Sussex
11B	Bath	10B	Culpeper	10B	Greene	9B	Louisa							11B	Tazewell
9B	Bedford	9B	Cumberland	8	Greensville	9B	Lunenburg							11B	Warren
11B	Bland	10B	Dickenson	9B	Halifax	11B	Madison							11B	Washington
9B	Botetourt	8	Dinwiddie	9B	Hanover	8	Mathews							8	Westmoreland
8	Brunswick	9B	Essex	8	Henrico	9B	Mecklenburg							10B	Wise
10B	Buchanan	10B	Fairfax	10B	Henry	8	Middlesex							11B	Wythe
9B	Buckingham	10B	Fauquier	11B	Highland									8	York



Independent Cities

Zone	City	Zone	City	Zone	City	Zone	City	Zone	City	Zone	City	Zone	City	Zone	City
10B	Alexandria	10B	Clifton Forge	10B	Fairfax	8	Hampton	10B	Manassas	10B	Norton	8	Richmond	8	Suffolk
9B	Bedford	8	Colonial Heights	10B	Falls Church	11B	Harrisonburg	10B	Manassas Park	8	Petersburg	9B	Roanoke	8	Virginia Beach
11B	Bristol	10B	Covington	8	Franklin	8	Hopewell	10B	Martinsville	8	Poquoson	9B	Salem	11B	Waynesboro
9B	Buena Vista	9B	Danville	10B	Fredericksburg	9B	Lexington	8	Newport News	8	Portsmouth	9B	South Boston	8	Williamsburg
9B	Charlottesville	8	Emporia	11B	Galax	9B	Lynchburg	8	Norfolk	11B	Radford	11B	Staunton	11B	Winchester
8	Chesapeake														

FIGURE 302.1(47)
VIRGINIA

Zone	County
12B	Adams
12A	Asotin
11B	Benton
12B	Chelan
12A	Clallam
11A	Clark
12A	Columbia
11A	Cowlitz
14A	Douglas
15	Ferry
11B	Franklin
12A	Garfield
12B	Grant
11A	Grays Harbor
12A	Island
11A	Jefferson
10A	King
11A	Kitsap
14A	Kittitas
12A	Klickitat
11A	Lewis
15	Lincoln
11A	Mason
15	Okanogan
11A	Pacific
15	Pend Oreille
11A	Pierce
12A	San Juan
11A	Skagit
11A	Skamania
11A	Snohomish
14A	Spokane
15	Stevens
11A	Thurston
11A	Wahkiakum
11B	Walla Walla
12A	Whatcom
14A	Whitman
12A	Yakima

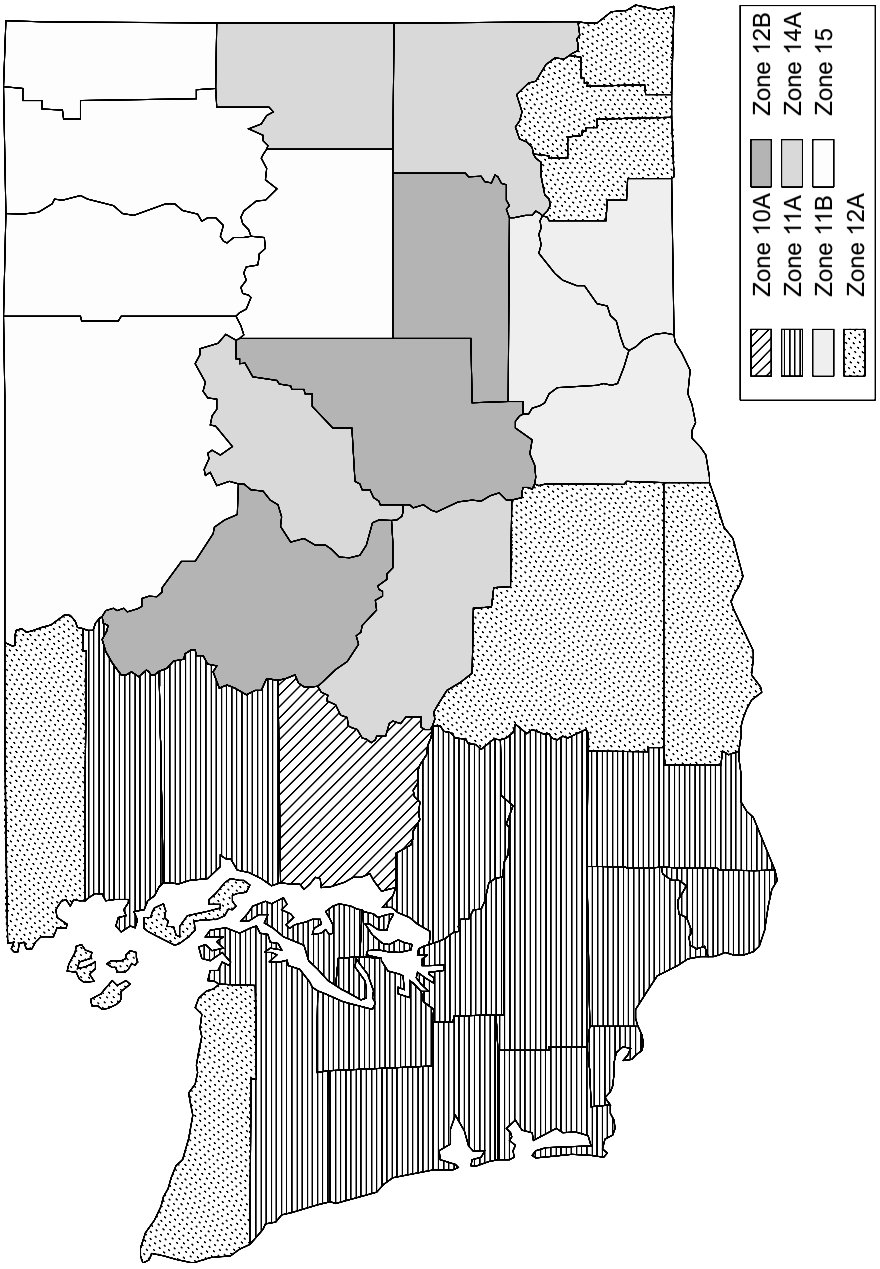
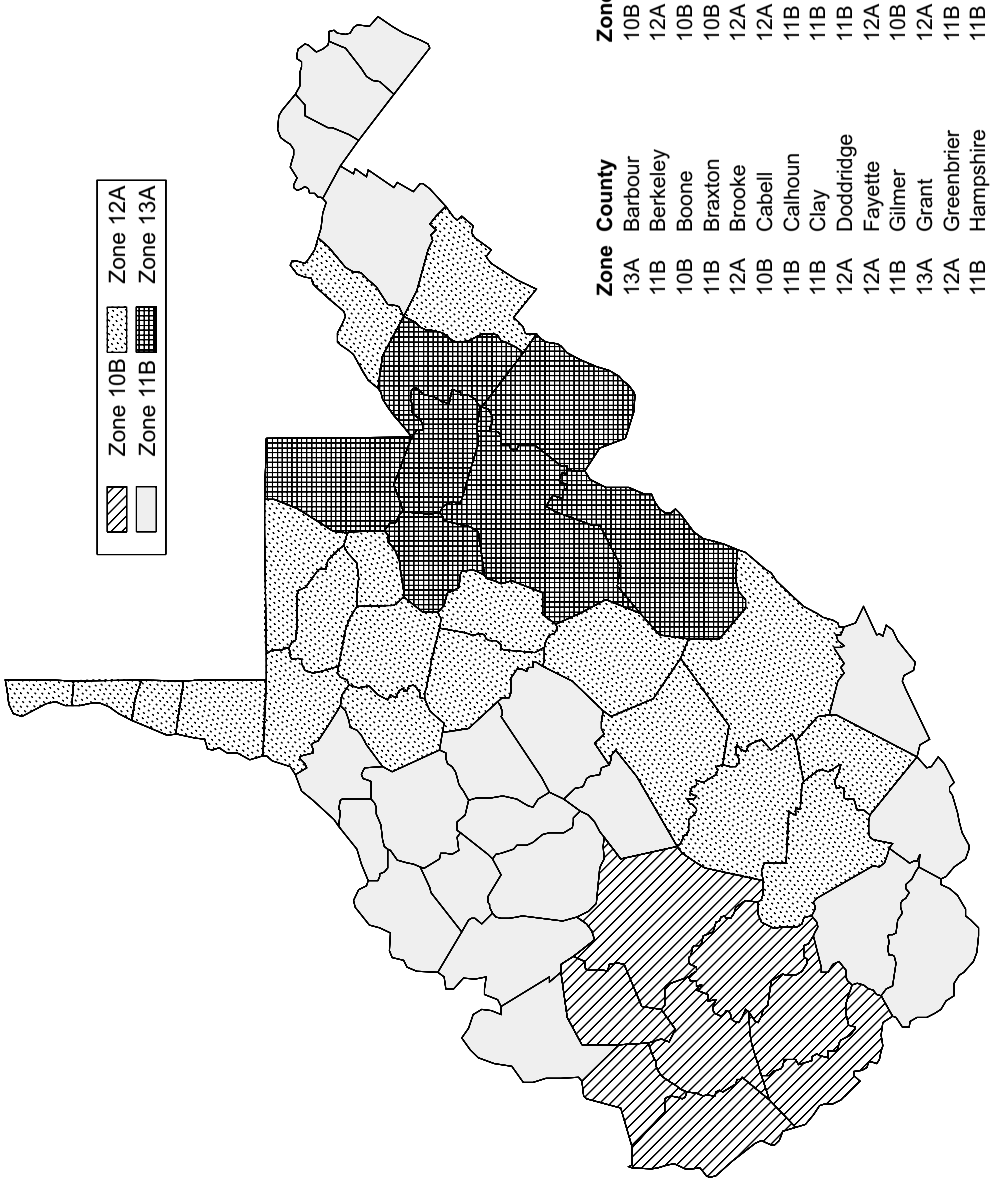


FIGURE 302.1(48)
WASHINGTON



Zone	County
13A	Barbour
11B	Berkeley
10B	Boone
11B	Braxton
12A	Brooke
10B	Cabell
11B	Calhoun
11B	Clay
12A	Doddridge
12A	Fayette
11B	Gilmer
13A	Grant
12A	Greenbrier
11B	Hampshire
12A	Hancock
12A	Hardy
12A	Harrison
11B	Jackson
11B	Jefferson

Zone	County
10B	Kanawha
12A	Lewis
10B	Lincoln
10B	Logan
12A	Marion
12A	Marshall
11B	Mason
11B	Mcdowell
11B	Mercer
12A	Mineral
10B	Mingo
12A	Monongalia
11B	Monroe
11B	Morgan
12A	Nicholas
12A	Ohio
13A	Pendleton
11B	Pleasants

Zone	County
13A	Pocahontas
13A	Preston
10B	Putnam
12A	Raleigh
13A	Randolph
11B	Ritchie
11B	Roane
12A	Summers
12A	Taylor
13A	Tucker
11B	Tyler
12A	Upshur
10B	Wayne
12A	Webster
12A	Wetzel
11B	Wirt
11B	Wood
11B	Wyoming

FIGURE 302.1(49)
WEST VIRGINIA

Zone	County
15	Adams
17	Ashland
16	Barron
17	Bayfield
15	Brown
15	Buffalo
17	Burnett
15	Calumet
15	Chippewa
15	Clark
15	Columbia
15	Crawford
15	Dane
15	Dodge
15	Door
17	Douglas
15	Dunn
15	Eau Claire
17	Florence
15	Fond Du Lac
17	Forest
15	Grant
15	Green
15	Green Lake
15	Iowa
17	Iron
15	Jackson
15	Jefferson
15	Juneau
15	Kenosha
15	Kewaunee
15	La Crosse
15	Lafayette
17	Langlade
17	Lincoln
15	Manitowoc
15	Marathon
15	Marinette
15	Marquette
15	Menominee
15	Milwaukee
15	Monroe
15	Oconto
17	Oneida
15	Outagamie
15	Ozaukee
15	Pepin
15	Pierce
16	Polk
15	Portage
17	Price
15	Racine
15	Richland
15	Rock
16	Rusk
15	Sauk
17	Sawyer
15	Shawano
15	Sheboygan
15	St Croix
17	Taylor
15	Trempealeau
15	Vernon
17	Vilas
15	Walworth
17	Washburn
15	Washington
15	Waukesha
15	Waupaca
15	Waushara
15	Winnebago
15	Wood

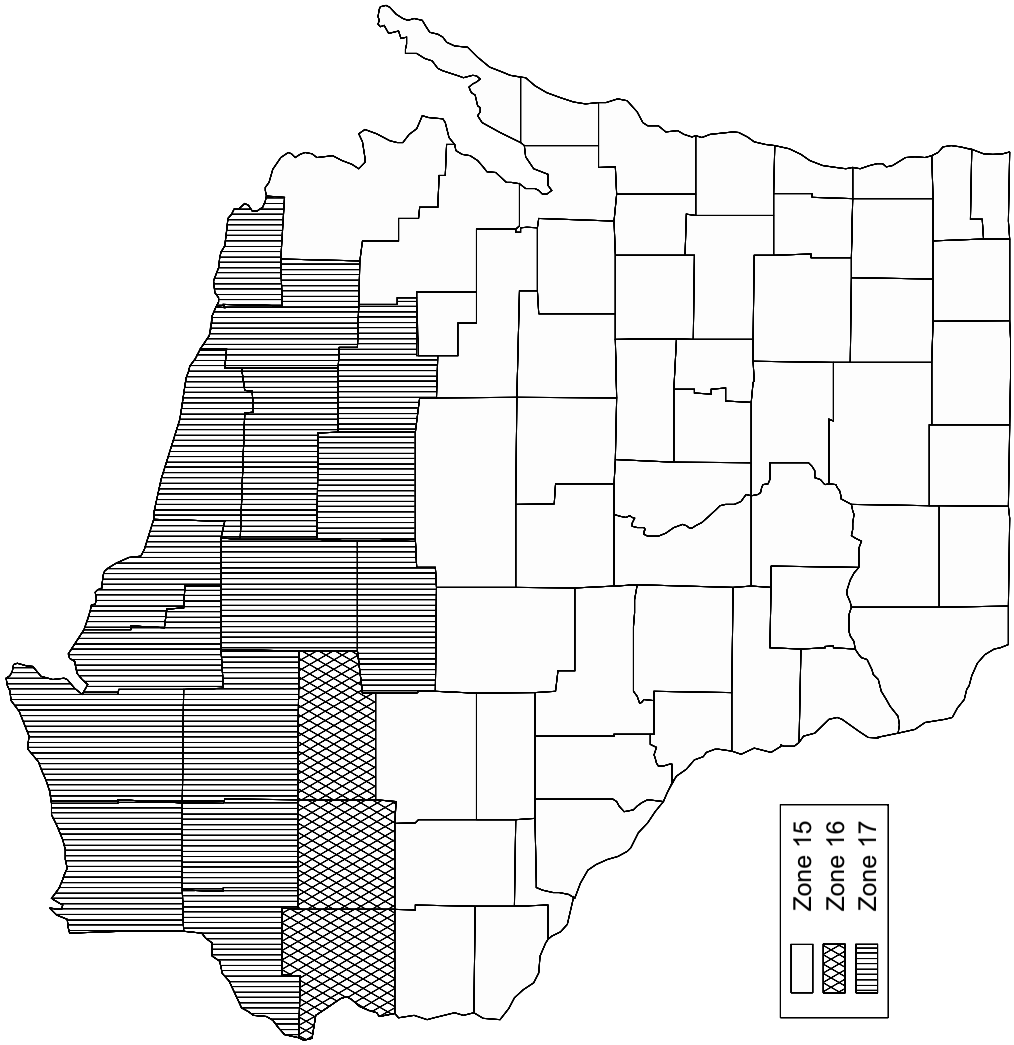


FIGURE 302.1(50)
WISCONSIN

Zone	County
16	Albany
15	Big Horn
15	Campbell
16	Carbon
15	Converse
15	Crook
15	Fremont
14B	Goshen
15	Hot Springs
15	Johnson
15	Laramie
17	Lincoln
15	Natrona
15	Niobrara
15	Park
14B	Platte
15	Sheridan
17	Sublette
16	Sweetwater
17	Teton
16	Uinta
15	Washakie
15	Weston

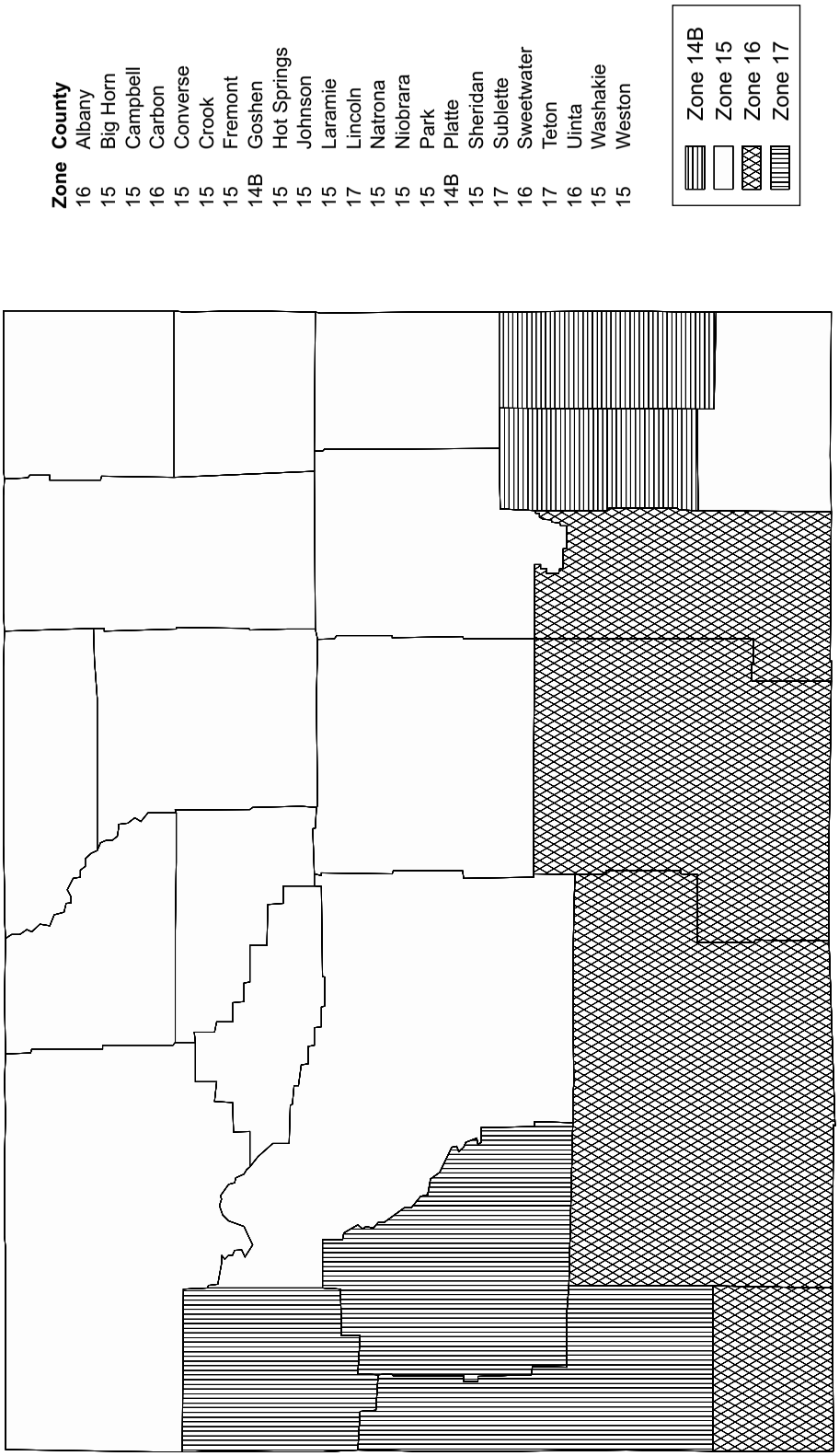


FIGURE 302.1(51)
WYOMING

CHAPTER 4

RESIDENTIAL BUILDING DESIGN BY SYSTEMS ANALYSIS AND DESIGN OF BUILDINGS UTILIZING RENEWABLE ENERGY SOURCES

SECTION 401 SCOPE

401.1 General. This chapter establishes design criteria in terms of total energy use by a residential building, including all of its systems.

SECTION 402 SYSTEMS ANALYSIS

402.1 Energy analysis. Compliance with this chapter will require an analysis of the annual energy usage, hereinafter called an "annual energy analysis."

Exception: Chapters 5 and 6 establishes criteria for different energy-consuming and enclosure elements of the building which, if followed, will eliminate the requirement for an annual energy analysis while meeting the intent of this code.

402.1.1 Standard design. A building designed in accordance with this chapter will be deemed as complying with this code if the calculated annual energy consumption is not greater than a similar building (defined as a "Standard design") whose enclosure elements and energy-consuming systems are designed in accordance with Chapter 5.

Exceptions:

1. The exterior wall assembly *U*-factors for the Standard design shall be selected by climate in accordance with Table 402.1.1(1).
2. The fenestration system *U*-factor used in the Standard design shall be selected by climate in accordance with Table 402.1.1(2).
3. The window area of the Standard design, inclusive of the framed sash and glazing area, shall be equal to 18 percent of the conditioned floor area of the Proposed design.
4. Skylights and other nonvertical roof glazing elements shall not be included in the Standard design, and ceiling *U*-factors used in the Standard design shall not include such elements in their computation.

402.1.2 Proposed design. For a proposed alternate building design (defined as a "Proposed design") to be considered similar to a "Standard design," it shall utilize the same energy source(s) for the same functions and have equal conditioned floor area and the same ratio of thermal envelope area to floor area (i.e., the same geometry), exterior design conditions, occupancy, climate data, and usage operational schedule as the Standard design.

TABLE 402.1.1(1)
STANDARD DESIGN WALL ASSEMBLY *U*-FACTORS (U_w)

HEATING DEGREE DAYS[a]	U_w (air to air)[b]
> 13,000	0.038
9,000-12,999	0.046
6,500-8,999	0.052
4,500-6,499	0.058
3,500-4,499	0.064
2,600-3,499	0.076
< 2,600	0.085

a. From Table 302.1.
b. Including framing effects.

TABLE 402.1.1(2)
STANDARD DESIGN FENESTRATION SYSTEM *U*-FACTORS (U_g or U_f)

HEATING DEGREE DAYS[a]	U_g FOR SECTION 502.2.1.1 AND U_f FOR SECTION 502.2.3.1 (air to air)[b]
> 13,000	0.25
9,000-12,999	0.26
6,500-8,999	0.28
4,500-6,499	0.30
3,500-4,499	0.41
2,600-3,499	0.44
700-2,599	0.47
< 700	0.74

a. From Table 302.1.
b. Entire assembly, including sash.

402.1.3 Input values for residential buildings. The input values in Sections 402.1.3.1 through 402.1.3.10 shall be used in calculating annual energy performance. The requirements of this section specifically indicate which variables shall remain constant between the Standard design and Proposed design calculations. The Standard design shall be a base version of the design that directly complies with the provisions of this code. The proposed building shall be permitted to utilize a design methodology that is demonstrated, through calculations satisfactory to the code official, to have equal or lower annual energy use than the Standard design.