Overview

CHAPTER 1

The state building code, which is a compilation of minimum uniform standards and requirements for constructing new buildings and remodeling existing ones, is designed to protect the health, safety, and welfare of Minnesota residents. This chapter provides descriptive information on the building code, its relationship to other state codes, and its applicability throughout the state. It focuses on the following research questions:

- **How is the state building code related to other state codes, such as the fire, electricity, and plumbing codes, among others?**
- **To what extent have cities and counties adopted the state building code?**
- **How much discretion do local jurisdictions have to alter or exceed code requirements?**

To answer these questions, we examined state legislation that created and later amended the state building code. We reviewed some local building and zoning ordinances, and we talked with several state and local officials who are responsible for administering or enforcing the state building code and other related codes.

Simply describing how the building code applies throughout the state is not an easy task. The geographic and structural applicability of the code has changed considerably over time. Today, the state building code is mandatory when constructing and remodeling all nonagricultural buildings throughout the seven-county metropolitan area, and for all public buildings paid for by the state, all public school building projects that cost at least $100,000, and certain state-licensed facilities, regardless of location. Municipalities outside the seven-county area that want to have a building code must adopt the state's code. At the same time, certain building code provisions--including those related to accessibility, electricity, elevators, and plumbing--are mandatory statewide, regardless of whether a municipality has chosen to adopt the state building code. In addition, there are other mandatory statewide codes--such as the state fire code--that cover some of the same subjects and contain similar requirements as the building code, that are technically not part of the state building code.

PROVISIONS

The building code contains minimum standards for construction and remodeling.

Minnesota statutes require that the Commissioner of Administration adopt minimum standards for new building construction and remodeling that govern structural materials, design and construction, fire protection, health, safety, and sanitation.[1] The purpose of these standards, which collectively make up the state building code, is to:

> . . . provide basic and uniform performance standards, establish reasonable safeguards for health, safety, welfare, comfort, and security of the residents of this state and provide for the use of modern methods, devices, materials, and techniques which will in part tend to lower construction costs. The construction of buildings should be permitted at the least possible cost consistent with recognized standards of health and safety.[2]

In addition to setting forth basic or minimum standards that are both "safety- and cost-conscious," statutes further require that the state building code conform as much as possible to model codes that are generally accepted and used nationally.[3] Model codes are "consensus documents" that are written by national organizations made up of state and local building officials, trade associations, construction organizations, suppliers, engineers and design professionals, and research groups. Model codes set forth generally-accepted basic minimum provisions that are considered necessary to safeguard the public.

Three model codes that set standards for building construction are widely used throughout the United States: the *National Building Code* published by the Building Officials and Code Administrators International, the *Uniform Building Code* published by the International Conference of Building Officials, and the *Standard Building Code* published by the Southern Building Code Congress International. As shown in Figure 1.1, Minnesota is one of 18 states that uses the *Uniform Building Code* as the basis for the state code's construction provisions. Other model codes used throughout the country are the *One and Two Family Dwelling Code* and the *Model Energy Code* published by the Council of American Building Officials, and the *Life Safety Code* and the *National Electrical Code* published by the National Fire Protection Association.

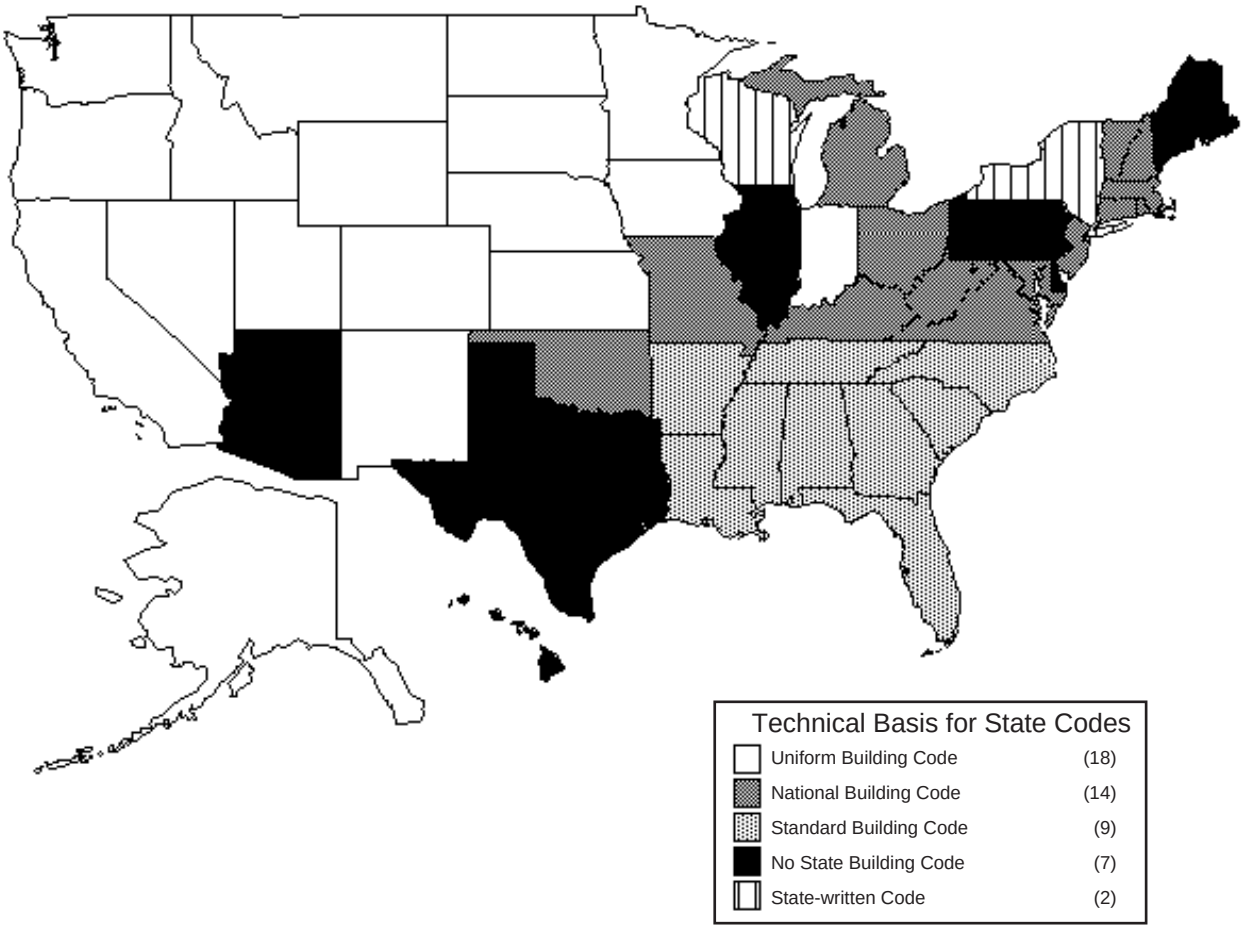
Figure 1.2 describes the major provisions of Minnesota's building code. The construction provisions, which consist of the *Uniform Building Code* and Minnesota's amendments to that code, set forth a comprehensive array of structural and fire protection requirements. These provisions classify buildings in a variety of ways, including occupancy use, type of construction, location on the property, allowable floor area, and height and number of stories. Specific code requirements vary considerably, depending on these factors. For example, the provisions generally classify buildings into 10 different occupancy or use classifications: assembly, business, educational, factory and industrial,

1 *Minn. Stat.* §16B.61.

2 *Minn. Stat.* §16B.59.

3 *Minn. Stat.* §16B.61.

Figure 1.1: Technical Basis for State Building Codes, 1998



SOURCE: National Conferences of States on Building Codes and Standards, Inc., *Directory of Building Codes and Regulations State Directory* (Herndon, Virginia: 1998).

hazardous, institutional, mercantile, residential, storage, and utility. There are often subdivisions within each of these 10 classifications. For instance, buildings to be used for assembly purposes, such as theaters, are further divided into five divisions, depending on how many people they can hold and whether the buildings have a stage. Institutional occupancies are further divided into four divisions: hospitals, nursing homes, and nurseries for the full-time care of children under six years of age; outpatient health care centers; detoxification centers and group homes for children at least six years of age; and mental hospitals, prisons, and other secure correctional facilities.

The code also classifies buildings into five types of construction, each representing varying degrees of public safety and resistance to fire. For example, Type I construction is the most fire resistant, and structural elements in these buildings must be made of steel, iron, concrete, or masonry. In contrast, Type V

Figure 1.2: Major Provisions of the 1998 Minnesota State Building Code

Construction	Standards for the fire, life, and structural safety aspects of buildings. Certain portions are optional.
Mechanical	Standards for designing, constructing, and maintaining heating, ventilating, cooling, and refrigeration systems.
Accessibility*	Handicapped accessibility requirements.
Electrical*	Standards for all aspects of electrical installations, wiring, apparatus, and equipment.
Plumbing*	Standards for plumbing installation and equipment.
Energy	Standards for energy efficiency and indoor air quality.
Special Fire Protection Systems	Optional requirements for installing building fire suppression systems in new buildings, buildings that have increased in size, or have changed occupancy classifications.
Elevators and Related Devices*	Standards for designing, constructing, installing, operating, altering, and repairing dumbwaiters, escalators, and moving walks and their hoistways.
Solar Energy Systems	Standards for evaluating solar energy systems used for heating, cooling, or hot water demands of buildings.
Fallout Shelters	Standards for fallout shelters in state-owned buildings.
Floodproofing	Special requirements for buildings located in areas susceptible to flooding. Certain portions are optional.
Manufactured Homes*	Requirements for transportable structures used as dwellings.
Prefabricated Buildings*	Standards for constructing and certifying manufactured residential buildings designed to be constructed off-site.
Industrialized/Modular Buildings*	Standards for buildings of closed construction including factory-built single-family and multifamily housing.
Storm Shelters*	Standards for buildings to provide protection for manufactured home park occupants from tornadoes and extreme winds.

NOTE: Excludes administrative provisions of the Minnesota state building code.

*Indicates that these provisions of the state building code are mandatory statewide.

SOURCE: Department of Administration, *Minnesota State Building Code* (St. Paul, 1998).

construction is the most combustible, and the structural elements in these buildings can be made of wood. Some types of construction are not allowed in certain occupancies. For example, theaters that hold more than 1,000 people and have a stage must be Type I or II construction, which means, in part, that certain exterior walls must have a 4-hour fire-resistant rating. In contrast, small theaters that hold less than 300 people and do not have a stage can be constructed of wood (Type V construction), and certain exterior walls can have a fire-resistant rating of 2 hours or less or have no rating, depending on how close the building is to the property line.[4]

Practically speaking:

- **The state building code is actually a compilation of numerous individual codes that have been developed by both state agencies and national organizations.**

Some of the provisions of the state building code actually predate the building code itself, which, as we discuss later, was not promulgated until the 1960s. For example, Minnesota has enforced statewide rules regarding electrical and plumbing installations since the mid-1930s--about 30 years before the state adopted its first building code.[5] Other provisions of the code were added much later. For instance, the Legislature did not require that the energy conservation provisions of the state building code be some of the most restrictive in the country until 1991.[6]

For the most part, the state building code is based on model codes that the state amends to reflect the unique concerns of Minnesota. In addition to the *Uniform Building Code*, the state has adopted the *National Electrical Code*, the *Uniform Mechanical Code*, the *American National Standard Safety Code for Elevators and Escalators*, and *Model Rules and Regulations for Industrialized Modular Buildings*, among other model codes.

Some provisions of the state building code are "homegrown"--state agencies develop them independently and do not rely on any single national model code.[7] For example, rather than adopting and amending one of the national model codes, the Department of Health has developed the building code's plumbing provisions and the Department of Public Service has developed the energy provisions.

Regardless of their origin, the different provisions of the state building code are often related to one another. For example, the energy provisions of the state building code deal with some of the same subject matter as the code's mechanical provisions. Likewise, the code's plumbing and construction provisions both address requirements related to roof drainage systems and the slope of roofs.

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4 Department of Administration, *1998 Minnesota State Building Code* (St. Paul, 1998), "Uniform Building Code," sec. 303, tables 5-A and 6-A.

5 Minnesota Legislative Research Committee, *Building Regulation in Minnesota* (St. Paul, 1948).

6 *Minn. Laws* (1991), ch. 149, sec. 4.

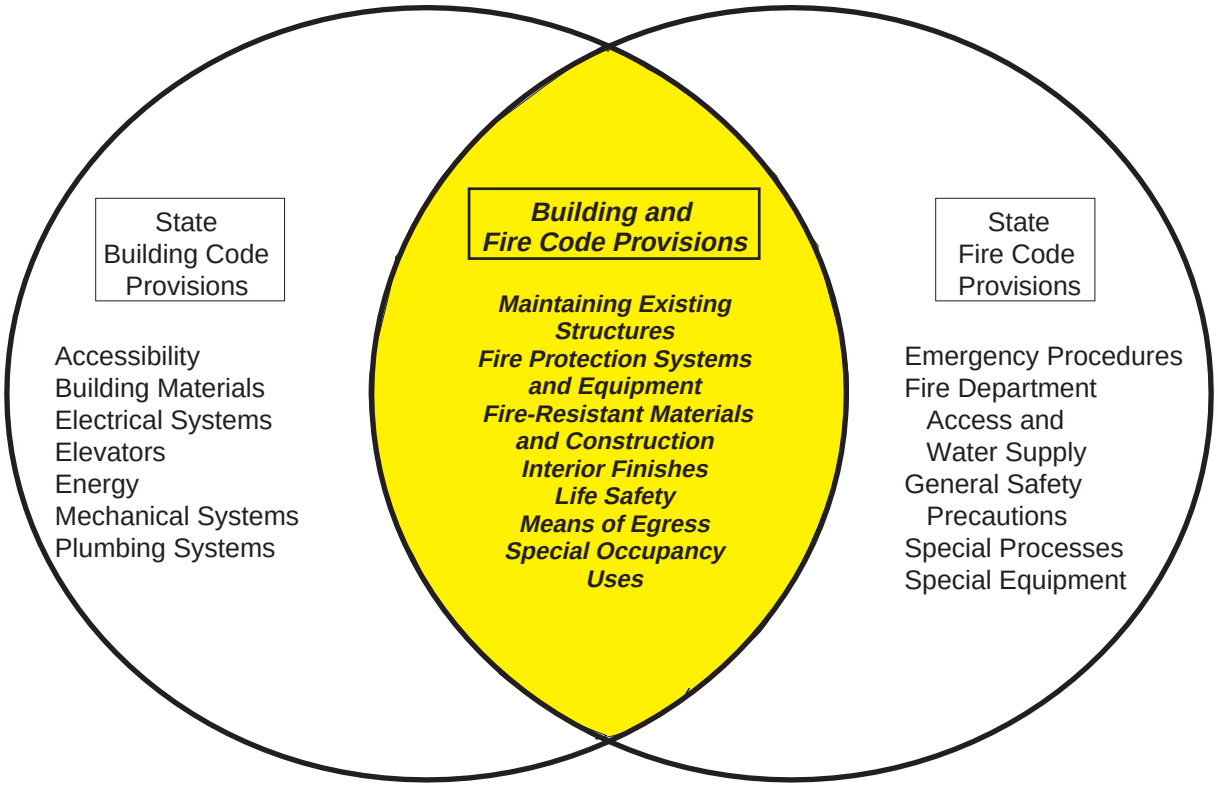
7 State agencies routinely consult model code documents or other sources of information when developing or writing homegrown codes.

In addition:

- **Other state codes cover some of the same subject matter and, at times, contain some of the same provisions as the state building code.**

As shown in Figure 1.3, both the state building code and the state fire code contain fire protection provisions. Generally speaking, the building code sets construction requirements that are enforced while a building is under construction, and the fire code sets use and maintenance requirements that are enforced once the building is constructed and throughout the life of the building. Both codes are based on national model codes, the *Uniform Building Code* and the *Uniform Fire Code*, that are designed to be companion documents. As a result, the state building and fire codes frequently reference one another. However, unlike the

Figure 1.3: Overlapping Provisions of the State Building and Fire Codes



NOTE: This figure contains only the major code provisions of the building and fire codes.

state building code which must consider cost factors, statutes do not specifically require that the state fire code be "cost-conscious."[8]

Some building code provisions overlap with fire code provisions.

Both building and fire codes set requirements for maintaining existing structures, fire protection systems and equipment, fire-resistant materials and construction, interior finishes, life safety, exits, and special occupancies.[9] Specifically, both codes define the types of occupancies in the same manner, and both require the same number of building exits and emergency escapes, depending on the type of occupancy. For instance, both codes require that the doors needed in hazardous areas or in areas with a minimum occupancy of 50 people be pivoted or side-hinged, and that they swing toward the exit path with an opening force not to exceed 30 pounds.[10] Both codes also set various requirements that establish when and where automatic sprinkler systems and smoke detectors must be installed in buildings.

At the same time, the state building code sets forth requirements in many subjects that are outside the scope of the fire code, such as accessibility, energy, and plumbing. Likewise, because the fire code deals with how buildings are used and maintained, some of its provisions are outside the scope of the building code. For example, the fire code specifies fire department access to buildings and water supply and sets requirements for building evacuation plans. In contrast, the state building code is silent on these "use" issues. Although statutes permit local municipalities to adopt more restrictive fire code provisions, they cannot amend the state building code. Therefore, municipalities cannot amend those provisions of the fire code that also appear in the state building code.

Similar to the overlap between the state building and fire codes, there is overlap between the mechanical provisions of the building code and state rules regarding high pressure steam piping and appurtenances that are promulgated by the Department of Labor and Industry. For example, the mechanical provisions of the state building code require that refrigeration machinery rooms in certain types of occupancies have four-hour fire resistant walls separating these rooms from the rest of the building.[11] Department of Labor and Industry rules also contain requirements for fire resistant walls in refrigeration machinery rooms. However, its provisions are less stringent, and only require that such rooms be separated by one-hour fire resistant construction.[12] Likewise, the Pollution Control Agency develops standards for individual sewage treatment systems and the Department

8 According to the Department of Public Safety, cost is one of several factors that the department considers when promulgating the state fire code.

9 Building code fire protection provisions that overlap with state fire code provisions are contained in the building code's construction provisions.

10 Department of Public Safety, *1998 Minnesota State Fire Code* (St. Paul, 1998), art. 12, sec. 1207.2 and Department of Administration, *Building Code*, "Uniform Building Code," sec. 1003.3.1.5.

11 Department of Administration, *Building Code,* "Uniform Building Code," sec. 2802 and table 3-B.

12 Department of Labor and Industry, *Power Piping Systems Code* (St. Paul, 1998), ch. 5230.5020.

of Natural Resources issues floodproofing and shoreline management regulations, all of which deal with some of the same subjects as the building code.

APPLICATION

Minnesota has had a state building code for over 30 years, although the geographic and structural applicability of the code has changed considerably in that time. The Legislature adopted the state's first building code in 1965, but required only that it be applied to state-owned buildings.[13] Statutes directed the Commissioner of Administration to develop, adopt, and enforce the code. At that time, local jurisdictions were free to either adopt the state's building code, adopt their own code, or have no code. Four years later, the Legislature required that the state boards of Electricity and Health, the Department of Labor and Industry, and the State Fire Marshal enforce certain provisions of the building code under the Department of Administration's supervision.[14]

In 1971 the Legislature mandated that the state building code supersede existing municipal codes, citing high construction costs caused by:

> a multitude of laws, ordinances, rules, regulations, and codes regulating the construction of buildings and use of materials . . . [that] . . . increase costs without providing correlative benefits of safety to owners, builders, tenants, and users of buildings . . .[15]

Before 1971 many cities and towns had their own building codes, and construction standards varied considerably across the state. The Legislature's action permitted municipalities to continue to enforce a building code if they so chose, but it had to be the state's building code.

The Legislature made the building code mandatory statewide in 1977, calling for both state and local enforcement.[16] However, in a reversal, the 1979 Legislature allowed counties outside the seven-county metropolitan area to opt out of the code by referenda and, two years later, it permitted small cities (fewer than 2,500 residents) in code-adopting, nonmetropolitan counties to opt out also.[17]

The building code's application across the state is complicated.

Currently:

- **The building code is not mandatory throughout Minnesota, although most of the state's residents are covered by the code.**

13 *Minn. Laws* (1965), ch. 623.

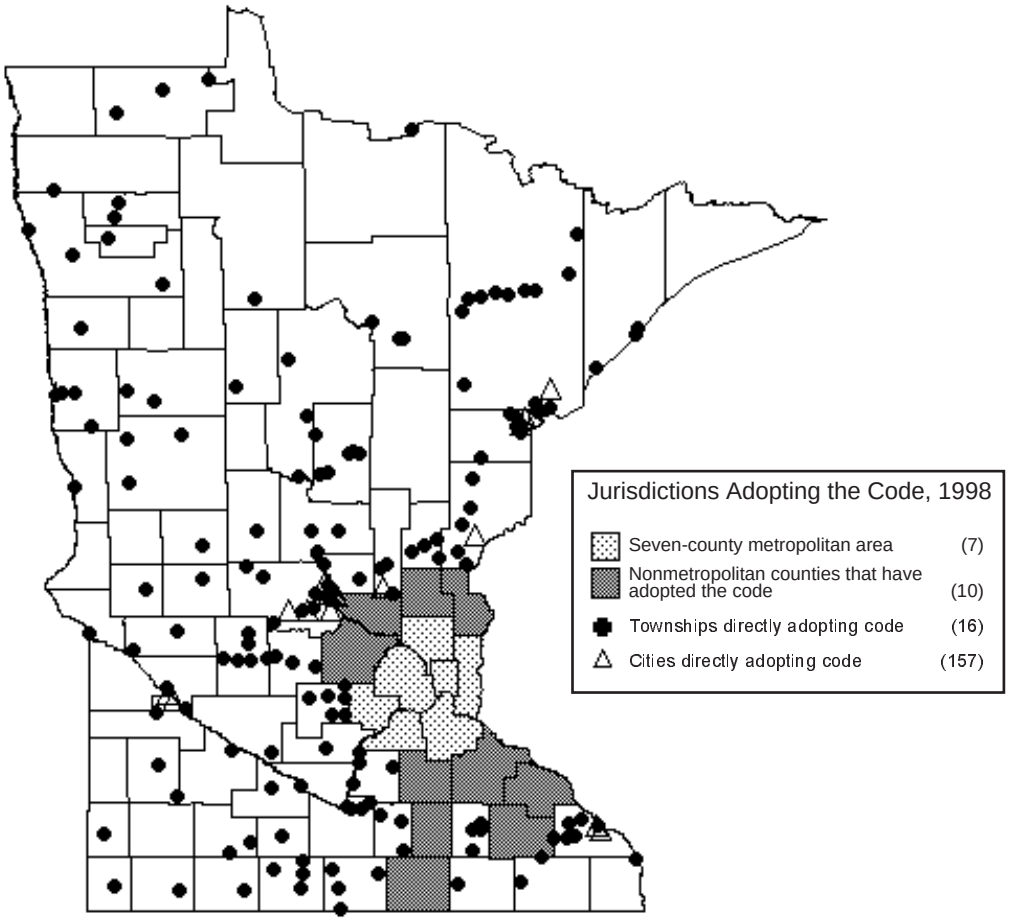
14 *Minn. Laws* (1969), ch. 850, sec. 3.

15 *Minn. Laws* (1971), ch. 561.

16 *Minn. Laws* (1977), ch. 381.

17 *Minn. Laws* (1979), ch. 287, sec. 2 and *Minn. Laws* (1981), ch. 306, sec. 1.

Figure 1.4: Jurisdictions Adopting the State Building Code, 1998



NOTE: Some jurisdictions within the 10 nonmetropolitan code-adopting counties may have opted out of the state building code.

SOURCE: Office of the Legislative Auditor.

Statutes require that all counties in the seven-county metropolitan area adopt the state building code. Ten other counties in southeastern Minnesota and about 170 cities and townships throughout the rest of the state have voluntarily adopted the state building code, as shown in Figure 1.4. Although only 20 percent of the state's counties, 44 percent of its cities, and 12 percent of its townships are covered by the building code, about 80 percent of the state's population live in these jurisdictions.

The state building code covers all new construction, except for agricultural buildings, and it applies to existing buildings that are being remodeled, rehabilitated, or altered.[18] However, as Figure 1.5 shows:

18 Minn. Stat. §16B.60, subd. 5 defines agricultural buildings as structures on agricultural land that are designed, constructed, and used to house farm implements, livestock, or agricultural produce or products.

Figure 1.5: Application of State Building Code Provisions

State Building Code Provisions	Code-Adopting Jurisdictions		Nonadopting Jurisdictions	
	Certain Public Buildings[1]	Other Buildings	Certain Public Buildings[1]	Other Buildings
Accessibility[2]	✓	✓	✓	✓
Construction	✓	✓	✓	N/A
Electrical	✓	✓	✓	✓
Elevators	✓	✓	✓	✓
Energy	✓	✓	✓	N/A
Fallout Shelters[2]	✓	N/A	✓	N/A
Fire Protection[3]	✓	✓	✓	N/A
Floodproofing	✓	✓	✓	N/A
Manufactured Homes	✓	✓	✓	✓
Mechanical	✓	✓	✓	N/A
Modular Buildings	✓	✓	✓	✓
Plumbing	✓	✓	✓	✓
Prefabricated Buildings	✓	✓	✓	✓
Solar Energy	✓	✓	✓	N/A
Storm Shelters	✓	✓	✓	✓

NOTES: ✓ = Code provision is applied to that building type; N/A = Code provision is not applied to that building type.

[1]Certain public buildings include buildings paid for by the state, all public school building projects that cost at least $100,000, and certain state-licensed facilities. Federal buildings and local government buildings in nonadopting jurisdictions are not covered by the building code.

[2]Accessibility requirements do not apply to one- and two-family residences. Fallout Shelter requirements apply only to state-owned public buildings.

[3]The fire protection provisions of the state building code are contained within the chapter of construction provisions. The fire protection provisions of the state fire code are applied in all buildings statewide.

SOURCE: Office of the Legislative Auditor.

- **Although the building code is not a statewide code, it applies to certain types of buildings statewide.**

These include buildings paid for by the state and all public school building projects that cost at least $100,000. Certain state-licensed facilities (hospitals, nursing homes, supervised living facilities, free-standing outpatient surgical centers, and correctional facilities) must also meet state building code requirements regardless of location. The state building code does not cover federal buildings, and those provisions that are not mandatory statewide do not

apply to local government buildings in jurisdictions that have not adopted the building code.

As we discussed earlier, specific code provisions have different requirements, depending largely on how a building is classified. For example, the building code does not require that builders install automatic fire sprinkler systems in single family homes, although the code does require that some other types of buildings have such systems. Also, historic buildings may be exempted from code provisions to preserve the historic or aesthetic character of the building as long as unsafe conditions are corrected. Although Minnesota statutes require that the Commissioner of Administration consider other ways to comply with the exempted code provisions for state-occupied buildings, the law does not require that the state actually implement any substitute requirements.[19]

In addition:

- **Although the building code is optional for most cities and counties outside the seven-county metropolitan area, certain provisions of the code are mandatory statewide.**

Some building code provisions are mandatory throughout Minnesota.

As shown in Figure 1.5, all nonagricultural buildings throughout the state must comply with the accessibility, electrical, elevator, manufactured home, plumbing, prefabricated and industrialized/modular building, and storm shelter provisions of the state building code.[20] In addition, buildings throughout the state must comply with the state fire code which, as shown previously in Figure 1.3, contains some of the same fire protection provisions as the state building code.

However:

- **Municipalities that have adopted the state building code do not have to enforce all of its provisions.**

Some provisions are optional: the appendix chapters of the *Uniform Building Code* dealing with one- and two-family homes, special fire protection systems, and certain portions of the floodproofing provisions.

Although municipalities cannot amend the state building code, statutes permit municipalities to request special provisions that are unique to their community.[21] Only Rochester has requested and received special consideration. Consequently, the state building code requires more restrictive fire sprinkler provisions for certain types of occupancies in Rochester.

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19 *Minn. Stat.* §16B.625.

20 The electrical provisions apply to all buildings, including agricultural buildings, statewide. The plumbing provisions apply to all buildings, including agricultural buildings, statewide except nonpublic buildings with private water and sewer connections.

21 *Minn. Stat.* §16B.64, subd. 5.

At the same time, we noted that:

- **While state law that creates the building code does not permit municipalities to amend it, other state laws permit more restrictive amendments to specific provisions of the code.**

For example, *Minn. Stat.* §326.243, which sets forth the basis for the state's electrical code, allows municipalities to adopt and enforce requirements that are more stringent than the electrical provisions that are contained in the building code. Likewise, statutes permit local governments to adopt rules for installing and maintaining automatic garage door systems that are more restrictive than the state standards contained in the building code.[22]

In addition:

- **Municipalities may adopt zoning ordinances that place additional restrictions on buildings or the construction process.[23]**

For example, Eagan requires that 50 percent or more of the exterior finish of buildings in certain residential zones must consist of noncombustible, nondegradeable, and maintenance free materials; sheet aluminum, iron, steel, and corrugated aluminum are specifically prohibited.[24] Roseville requires that the exterior finish of buildings outside certain residential zones must be made of face brick; stone; specially designed, precast concrete units; glass; finished metal; fiberglass or similar materials of cor-ten steel; or stucco or other cementation.[25] In contrast, the state building code simply requires that a building's exterior finish must provide weather protection for the building.[26]

Finally:

- **Building officials have considerable discretion in how to enforce and interpret provisions of the state building code.**

"Equivalencies" allow builders to comply with the code in different ways.

Statutes require that the building code must be written as much as possible in terms of desired results rather than specifying the means to obtain those results. Thus, the code encourages designers and builders to seek new ways to achieve its goals, and building officials are given wide latitude to grant "equivalencies" that allow builders to achieve the code's goals in diverse ways. Statutes define equivalencies as measures other than a code requirement that provide essentially the same protection that would be provided by a code requirement.[27] For example, a manufacturer may want to construct a new, three-story building using

22 *Minn. Stat.* §325F.83, subd. 7.

23 *Minn. Stat.* §394.25, subd. 3.

24 *City Code of Eagan,* sec. 11.20, H.

25 *City Code of Roseville*, 1010.02.

26 Department of Administration, *Building Code,* "Uniform Building Code," sec. 1401.1.

27 *Minn. Stat.* §16B.60, subd. 10.

wood-frame construction. Because the proposed building's size would exceed building code limits for such construction, the builder must provide equal protection for building occupants in other ways. Possible equivalencies might include increasing the number of exits, shortening the travel distance to exits, increasing the number of fire detectors and alarms, or upgrading sprinkler systems.[28] Building officials determine whether these changes provide protection for the building's occupants equal to the protection that would be provided if the building were constructed strictly according to the building code, and may approve or disapprove their use.

SUMMARY

Overall, we found that the geographic and structural applicability of the building code has changed considerably since the Legislature adopted the state's first building code in 1965. As a result, the state building code is a complex compilation of closely-related state and national provisions that apply to various types of buildings throughout the state. Today, the state building code is mandatory for all nonagricultural buildings throughout the seven-county metropolitan area, and for all buildings paid for by the state, all public school building projects that cost $100,000 or more, and certain state-licensed facilities, regardless of location. Municipalities outside the seven-county area must adopt the state's building code if they want to have a local building code. At the same time, certain building code provisions--including those related to accessibility, electricity, elevators, and plumbing--are mandatory statewide, regardless of whether a municipality has adopted the building code. In addition, there are other mandatory statewide codes--such as the state fire code--that cover some of the same subjects and have similar requirements as the building code, that are technically not part of the state building code. Finally, building officials have considerable discretion in how to enforce and interpret provisions of the state building code.

28 J. R. Mehaffey, "Combustibility of Building Materials," 1987, URL http://www.nrc.ca/irc/bsi/87-2_E.html, (September 1988).