City of Lawrence Code Review Committee

Final Report and Recommendation

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EXECUTIVE SUMMARY

The Code Review Committee (CRC) began meeting in July 2003 and has met regularly to compare the model building code organizations: the National Fire Protection Agency (NFPA) and the International Code Council (ICC). The purpose of the comparison was to determine which organization's code set is most suitable for adoption by the City of Lawrence. The CRC established evaluation criteria, heard presentations from both organizations, developed follow-up questions for both organizations, heard public comment, and developed a final recommendation and report. The CRC considered various factors including:

- minimum life-safety needs,
- adequate support for training, certification, and interpretations,
- clear language within the code,
- minimal impact of transition on code users,
- the acceptability of the codes by staff and the development community,
- minimal financial costs to the City for ongoing maintenance, and
- clear and adequate provisions for the construction of one- and two-family dwellings.

The Committee believes that it is key that building, fire, mechanical, and plumbing codes are adopted from the same set of codes. The Committee found that both organizations produce codes that contain adequate provisions for life-safety; both offer support services for training, certification, and interpretations. However, the Committee believes the ICC support services are more locally accessible. Both sets of codes rely on referenced standards, however the NFPA codes do so to a greater degree. For the various factors compared, the Committee found that transition to, and long-term use of, the ICC codes would have less adverse impact on staff and other code users. Finally, the Committee found that the development process for amending and maintaining the ICC codes is less prone to special interests.

The Committee recommends that the ICC codes, including the International Building Code, International Fire Code, International Residential Code, International Mechanical Code, International Plumbing Code, and International Fuel-Gas Code, be the base model codes for the City of Lawrence.

The following list summarizes the comments of the CRC during the discussion of the two code sets and serves as justification for the committee's recommendation to the City Commission to adopt the aforementioned ICC codes.

- The ICC has a more established record of producing and supporting building codes.

- Research reports and product information for new materials and designs is available through the ICC.

- The ICC is less prone to special interest while developing code.

- Transition to the ICC codes will be easier because these codes utilize the common code format used in the predecessor codes that is familiar to code users in Lawrence. The common format and greater resemblance to the UBC currently enforced will result in a shorter learning curve.

- The ICC provides greater local access for training for designers, contractors, and enforcement staff. Also, the ICC has developed and maintains an Internet training program.

- Training and continuing education classes associated with the Johnson County contractor-licensing program are based on the I-Codes. Continuing education required in conjunction with new contractor licensing in Lawrence would be greatly enhanced if the Johnson County program were available.

- It is easier to train trades-people under the ICC codes because there are more prescriptive code requirements. Regulations are uniform and contain precise numbers or measurements, and are more accessible because the I-Codes are less likely to reference other standards for common installations.

- It was mentioned that it is not seen as a problem for trades-people which of the codes Lawrence chooses to adopt, but the decision does impact staff. A transition to the I-Codes would be easier for staff. The appeals boards will continue the technical code review process.

- Because the IRC contains all construction regulations for building, mechanical, electrical, and plumbing work to be done on one- and two-family dwellings, the adoption of the IRC provides all parties with uniform access to information.

- Either set of codes may be amended to address local building concerns.

- One of the factors to keep in mind is the surrounding communities. Many of these communities have adopted the I-Codes, and there is no known municipality that has adopted or plans to adopt the NFPA 5000. Being on a different code set would allow for greater errors and be confusing to code users. Also, the state fire marshal's office is on track to adopt the IBC.

- It was mentioned during the NFPA presentation the NFPA is close to including regulations to require fire sprinkler systems in single-family residences. There was concern that such a requirement would increase the challenge of providing affordable housing.

- One single set of codes would be beneficial to staff, engineers and architects, and other users. NFPA is still a new code and some issues still need to be worked out while the ICC has the support of professional organizations, such as the American Planning Association and the American Institute of Architects.

I. INTRODUCTION

A. Committee Composition and Charge

The Code Review Committee (CRC) was established to review and compare the organizations publishing the new national model building code sets, and to provide a recommendation to the City Commission regarding the adoption of the next model building codes in Lawrence.

The Code Review Committee began meeting in July 2003, and in August heard presentations from representatives of the National Fire Protection Agency (NFPA) and the International Code Council (ICC). Debriefs were prepared by staff comparing the information received from each organization with evaluation criteria developed by the CRC, and debrief meetings were held the week after each presentation. All meetings have been open to the public, and after the August/September presentations and debrief meetings a meeting was held on September 30, 2003 to receive public comment. Additional meetings were held in November and December for Committee analysis. The Committee met in January 2004 to prepare a draft report, and to receive public input about the report.

Some of the information presented to and utilized by the CRC is attached to this Report. Additionally, this Report, the CRC meeting schedule, all meeting minutes, all handouts and presentations, and any other materials related to the activities of this Committee are available for review on the City of Lawrence, Neighborhood Resources Department website at www.lawrenceneighres.org.

B. Currently adopted building codes

Lawrence's currently adopted building codes are:

1997 Uniform Building Code
1997 Uniform Fire Code
1999 National Electric Code
2000 Uniform Plumbing Code
2000 Uniform Mechanical Code

Each of these codes is amended.

C. New National Model Codes – The Reason to Review

All states and local jurisdictions have had to consider adoption of new model codes because none of the former model building codes is still being published. Codes and standards that regulate the built environment continue to evolve. Most are reviewed and republished at regular intervals, typically every three to five years.

These codes were written by cooperating organizations so that all provisions remained consistent between the building and fire codes. This link is important because a building code regulates new building design and construction and a fire code, which contains some provisions for new construction, also regulates the ongoing use and maintenance of that building. The codes evolve

to reflect new technologies in building design and construction, as well as improvements in systems designed to protect the occupants of a building during emergency situations.

The Uniform Building Code (UBC) currently in use is no longer being published. The publishers of the UBC and two other national model codes have merged to become the ICC and have produced a series of International Codes including the International Building Code (IBC) and the International Fire Code (IFC).

The publishers of the Uniform Fire Code (UFC) have joined with NFPA to produce a new fire code entitled NFPA 1/Uniform Fire Code as part of the NFPA set of codes. NFPA has developed a new building code - NFPA 5000 - as part of their set of codes.

International Code Council (ICC):

In December 1994, the International Code Council was established. The ICC founders, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), and the Southern Building Code Congress International (SBCCI) created the ICC in response to pressure from the federal government and private industry to standardize model codes across the United States.

The first edition of the *International Building Code (2000)* was the culmination of an effort initiated in 1997 by the ICC. This included five drafting subcommittees appointed by ICC and consisting of representatives of the three statutory members of the International Code Council: BOCA, ICBO and SBCCI. Technical content of the latest model codes promulgated by BOCA, ICBO and SBCCI was utilized as the basis for the development, followed by public hearings in 1997, 1998 and 1999 to consider proposed changes. The 2003 edition is the first revision of the original 2000 IBC.

National Fire Protection Association (NFPA):

Established in 1896, the mission of this international, nonprofit, member organization is to reduce the worldwide burden of fire and other hazards on the quality of life by developing and advocating scientifically based consensus codes and standards, research, training, and education. In June 2000, NFPA, the Western Fire Chiefs Association (WFCA) and the International Association of Plumbing and Mechanical Officials (IAPMO) began the development of the NFPA building code.

The first edition of *NFPA 5000, Building Construction and Safety Code*, was prepared by all of the building code committees during public meetings from June 2000 - May 2002. The Standards Council issued the NFPA Building Code on July 19, 2002, with an effective date of August 8, 2002.

II. BUILDING CODE

A. Organization

The IBC is organized in the common code format established in the early 1990's by the ICC organizations. The topic areas are in the same chapters as found in the current UBC. There are minor changes in location for specific topics, but the major topics are in the locations familiar to UBC users.

The NFPA 5000 code is organized by occupancy classification with each separate occupancy in its own chapter, which closely follows the format of NFPA's Life Safety Code that has been widely used since the 1950's. Other topics, such as means of egress or structural design, are broken down into chapters along similar lines as the common code format. The location in the code differs significantly from the UBC chapters. (The UBC and the IBC each have 35 chapters; the NFPA 5000 has 55 chapters.)

Because the NFPA 5000 code is organized based upon occupancy, but also contains chapters that apply generally to all occupancies, unique provisions regulating an occupancy must still be coordinated with general provisions for all buildings. For example, special provisions for exit systems in hospitals are found in the Health Care Occupancies chapter. However these must still be coordinated with general exit provisions for all buildings found in the Means of Egress chapter. In comparison, the IBC integrates unique provisions within the topical chapter. For example, if hospitals have a special provision for corridors in the exit system, that specific provision is found in the corridor provisions of the Means of Egress chapter. The organization and format of the IBC is similar to that contained in the UBC.

Both codes extensively reference to other construction /installation standards contained in separate nationally recognized publications. The NFPA 5000 code is more extensive in referencing and is more dependent on those standards for key construction standards. Greater use of referenced standards rather than inclusion of provisions in a code impacts usability in two ways. The first is the cost of adoption. Each referenced standard is a separate document and must be purchased separately. Secondly, the greater use of referenced documents reduces the usability of a single document.

Both codes contain provisions for new designs, materials, and construction methods. For NFPA 5000, new materials and technologies are permitted using Chapter 5 Performance Based Design Options where the prescriptive code may not address it. This chapter considers equivalency in meeting the goals and objectives of the code. The ICC recognizes the need for innovative methods, materials and designs. The provision for alternate materials and methods of construction is found in section 104.11 of the 2003 IBC. Section 104.11.1 provides for the use of research reports for which the ICC is the only organization that has an in-place program that recognizes over 1,500 products, materials, and other alternatives.

B. Creation of the New Model Codes

The IBC was created by a melding of requirements from three existing model codes previously used regionally throughout the nation. The development occurred over a five-year period through

a public process. These three existing model codes were the predominate codes used throughout country. The development process of the IBC was to incorporate the best and most practical requirements from each code. When regulations of the same subject differed among the codes, generally the least restrictive of the regulations was adopted into the IBC. This IBC development process reflected a philosophy that when a regulation had proven successful in one part of the country, it should be adequate for the entire country. Each of the three codes used as the basis for IBC has been individually published and refined over the past 75 years. NFPA also has a considerable history in writing standards to improve fire and life safety in buildings and facilities. NFPA publishes many of the standards referenced in both the NFPA and ICC codes. While NFPA has created standards for more than 100 years, the NFPA 5000 code is their first complete building code. The NFPA 5000 was developed from two key sources, the building code of the Reedy Creek Improvement District and various NPFA codes and standards. The process to develop the NFPA 5000 code covered a span of approximately two years. The primary area of Reedy Creek's jurisdiction is the Disney World Complex in Florida.

III. OTHER CONSIDERATIONS

A. "Family" of codes

The relationship between the various construction codes is an important factor. Most buildings are constructed utilizing building, mechanical, plumbing and electrical codes. Those buildings must be maintained through the enforcement of the fire code. A fully integrated set of codes would be ideal. This is sometimes referred to as a "family of codes". Neither organization has a complete set, or family, of codes. The National Fire Protection Association (NFPA), with its partner organizations, has developed a set of codes. NFPA's partners include the International Association of Plumbing and Mechanical Officials (Uniform Plumbing Code and Uniform Mechanical Code) and the Western Fire Chiefs (NFPA 1/Uniform Fire Code). However, NFPA has not created a separate residential dwelling code. Requirements for one and two family occupancies are incorporated within the NFPA 5000. The NFPA 5000 also references the International Code Council's (ICC) International Residential Code (IRC). There are different standards for residential construction in the NFPA 5000 and the IRC. This NFPA 5000 reference sets up a conflict in residential standards.

The ICC has developed a set of codes with the exception of a complete electrical code. In order to provide an electrical code, ICC references the NFPA 70 – National Electrical Code. The ICC does publish a separate residential code, which is referenced in the IBC.

Historically, Lawrence has operated under an assembly of codes produced by different organizations. This practice will need to continue; however with the creation of the ICC and the development of new building codes by NFPA this practice can be greatly reduced. Both organizations have nearly comprehensive code sets and the CRC believes that a single code set should be adopted to the extent possible. The codes are developed as integrated documents by the same national organizations, and these organizations have processes that assure that the coordination of those documents is maintained over time.

The committee believes that it is key that building, fire, mechanical, and plumbing codes are adopted from the same set of codes. Generally the building code regulates how buildings are constructed, the mechanical code provides how heating and cooling systems are installed, and the fire code primarily regulates how buildings are to be maintained once built. If these key codes were adopted from different sets, the impacts to the building construction industry and to long-term users of those buildings would be significant. It is possible that these codes be adopted from different code sets, but utilization and enforcement of the codes would be slow, confusing, and filled with trial and error. Adopting building, mechanical, and fire codes from differing code sets may result in differing regulations between codes or omission of regulations for critical building elements, causing increased research time for city enforcement staff and designers, increased confusion among all users, and increased subjectivity in enforcement.

B. Residential code

Historically the City of Lawrence has not adopted a residential building code. The UBC has contained provisions for residential construction, including structural and non-structural provisions that have been adequate for the construction of one- and two-family dwellings. Neither the IBC nor NFPA 5000 contains complete provisions for the construction of one- and two-family dwellings. The NFPA 5000 code contains non-structural provisions, such as emergency escape, minimum egress, smoke detection, and stairways and handrails, but references other codes and standards for structural provisions. One of the standards referenced by the NFPA 5000 is the International Residential Code (IRC). The IBC references the IRC for structural and non-structural code provisions for the construction of one- and two-family dwellings. The IRC contains provisions for the complete construction of a dwelling, including heating and air-conditioning, plumbing, and electrical work.

The Council of American Building Officials (CABO) published the CABO One and Two Family Dwelling Code. In 1998, that code was retitled the International One and Two Family Dwelling Code, reflecting the fact that its development and publication was transferred to the ICC. CABO no longer exists as an organization. Like the other model codes from separate organizations, the One and Two Family Code is no longer in development but has been succeeded by the IRC. The International One and Two Family Code was the primary source document for creation of the IRC.

C. Model Energy Code and Existing Buildings Code

Both organizations publish model energy codes, NFPA 900, Building Energy Code, and ICC International Energy Conservation Code. The purpose of model energy codes is to encourage the energy efficient design of buildings. Typically this includes the design of the building envelope, the installation of building services systems, and the use of new materials and designs.

Both building code sets also provide provisions for existing buildings, including alterations and changes of Use. ICC publishes the International Existing Building Code as a stand-alone document, which provides expanded provisions for altering, improving and upgrading existing buildings to conserve resources and history.

D. Process of Code Development

Also reviewed by the CRC were the processes by which the codes are updated and maintained by the national organizations. The ongoing development process for each set of codes is similar, with some key differences. Both sets of codes are published every three years, reflecting the changes approved. ICC has two – 18 month review cycles between each publication. NFPA's code change process is a two yearlong cycle. This seems to be out of sequence with NFPA's three-year code publication schedule.

In both processes, proposals are accepted from any source, assigned to a committee for review and decision, followed by an opportunity for future review by the full membership of the organization. Both organizations publish proposals and results of committee actions for interested parties to review and consider. In both processes, representatives of the design, construction, materials and regulatory communities are represented on the various committees. Members of committees are appointed from various interest groups. In both processes, the final vote of the membership can be appealed to another level, for the ICC the ICC board of directors, for NFPA a Standards Council appointed by the NFPA board of directors.

There are distinct differences in the processes:

At the committee level, NFPA bylaws state that no more than one-third of any committee can represent the same interest group. NFPA bylaws list at least 20 different interest groups. There is nothing in the bylaws that dictates that a committee membership include representatives from the regulatory community. NFPA has at least 15 committees that address parts of the NFPA 5000 building code. The NFPA committees are scheduled to meet concurrently, but not necessarily at the same location. Further, the NFPA committee process includes a second step, allowing a revised committee vote that occurs by mail without the holding of a public meeting. At the committee level, ICC includes members from both the regulatory and industry communities. There are only four committees used for maintaining the IBC and all committees for the IBC and the other ICC codes meet concurrently and in one location. There is no second step to the committee process.

In both organizations, committee actions can be reconsidered by the membership at an "annual" meeting. At those meetings, votes are taken to uphold, modify or overturn a committee's decision. Voting eligibility at this stage is distinctly different. For NFPA, any NFPA member who attends the meeting may vote. As compared to the committee level where no more than one-third of a committee can represent the same interest group, there is no such limit at the final vote. It is possible for any interest group within NFPA to send a large number of its members to an NFPA annual meeting and dominate a vote. ICC, on the other hand, restricts the final vote for determining regulations within the code to members who represent jurisdictions that enforce the codes. Thus, industry and other non-regulating interest groups do not vote at this stage. ICC believes that it is appropriate to restrict the final vote determining content to a group with no financial interest in the outcome, but base their votes on the provision of safe buildings for the people of their jurisdictions. Both processes are referred to by these two organizations as "consensus" processes. Neither meets a dictionary definition of the term "consensus". Despite

the differences in the voting process, it should also be noted that industry representatives are heavily involved in both processes.

E. Support for Training

Both organizations have training departments for support of enforcement staff as well as designers, builders, building owners and others. There is also qualified staff within each organization to support requests for information or interpretation of a code provision. For NFPA, Code opinions are provided via phone and email with typical turnaround times of 48 hours. Formal interpretations require a significantly greater turnaround time. Most technical staff can be reached by phone or email however the minimum turnaround time indicated is 48 hours for an opinion. ICC provides three types of code interpretations; phone or email staff opinions, written staff opinions, and a formal, published position developed through an interpretation committee. Phone or email interpretations are provided within 24 hours. Turnaround time for written staff opinions is five days for single interpretations, but can take longer for more complicated responses. Formal interpretations take a minimum of two weeks.

Both organizations require payment for their training programs, but have offered to provide free initial training for the Lawrence enforcement staff. NFPA has stated they will provide free training for inspectors, and free codebooks for inspectors attending training. ICC has offered to provide training in conjunction with the adoption of the codes by assisting the Building Code Board of Appeals and the Fire Code Board of Appeals with the review of the IBC and IFC. Governmental members of ICC receive free codebooks. ICC also provides some free training to local chapters of ICC. The local chapters generally charge a nominal registration fee for attending these training sessions. NFPA has no chapter subdivision as part of their organizational structure. ICC provides online training at www.icccampus.org. This online training program features 90 interactive and self-instructional courses that address code-specific and non-technical subjects. Fees range from $40 to $70.

The training required for either of these codes will be greater than a typical code change cycle involving the UBC and UFC. During the review process, the CRC discovered many examples in which the transition to the NFPA 5000 and NFPA1/UFC will require more extensive training. This is because the NFPA codes differ from the UBC and UFC more substantially than the IBC and IFC.

The CRC is also concerned about the ability of NFPA staff to fully support their code documents in the manner that code officials have come to expect from the International Conference of Building Officials (now the ICC). This concern centers on the fact that the NFPA 5000 code is essentially a new document and NFPA will need to add new staff for support in the interpretation and information area where as ICC already has that staff in place.

Both organizations also provide inspector certification programs. NFPA offers certification for building inspectors and plans examiners. Sylvan Learning Centers are authorized administrators of NFPA certification exams to provide local access. Reciprocity is permitted for those inspectors certified by other codes upon taking a test or attending a two-day seminar, which could be included in the initial training at no cost. ICC offers national certification in 54 categories,

including all of the code administration professions. Examination options include paper testing, provided six times per year at various locations throughout the country, including the Kansas City, Mo. Area. Also, computer based testing is available at Prommissor testing centers including locations in Topeka and Kansas City. ICBO certifications currently held by city staff are transferable. ICC places a large emphasis on "support infrastructure", which is described as education, training, certification of code officials, evaluation of new products and designs, accreditation of testing labs and quality assurance agencies, and technical support services. The support infrastructure is to help ensure that what is intended by the code is actually realized and maintained in the field. These ICC support services are already in place.

F. Code Acceptance

The American Healthcare Association has adopted NFPA 5000 for use in their member facilities. ANSI has accredited the code set. IAPMO and ASHRAE are partners in the NFPA codes. All nursing homes that obtain federal funding are required to meet NFPA 5000. California has adopted NFPA 5000, as has Pasadena, TX. Many states and municipalities currently use NFPA in their code enforcement.

Organizations that have endorsed the ICC include the National Association of Home Builders, the American Planning Association, the National Multi-Housing Council, the National Apartment Association, the Building Owners and Managers Association, the International City Managers Association, and the American Institute of Architects. These and other organizations are listed in "A Complete Building Safety System – Not Just Codes", which is an attachment to the ICC handout.

Forty-four states have adopted the IBC through statewide or local adoption. Similarly, forty-three states have adopted the IRC. The Department of Defense has adopted the International Plumbing Code (IPC), International Mechanical Code (IMC) and IBC in its Unified Facilities Criteria as the basis for all military construction. ICC has provided a listing, "International Codes – Adoption by State", as an attachment to the ICC handout.

In the State of Kansas the IBC and IRC are being widely adopted. We are aware of no jurisdiction within the state planning to adopt the NFPA 5000. A survey of codes adopted by Kansas's cities is attached to this report.

G. Transition

Transition to either of the codes will be more difficult than an adoption of a new edition of the city's existing code code. Staff training requirements will be more significant, as will training for designers and other code users. ICC has technical representatives located in the Kansas City metro area and has offered to assist with the City's technical review of the ICC codes. The familiar code format of the IBC and IFC will facilitate code review by staff and code review boards. NFPA does not have facilities in our area to readily assist with code review.

Familiarity is an important consideration for use of a new code. The organization and format of the NFPA code system will not be familiar to Lawrence code users and will take additional training,

cost and experience to know how to coordinate such provisions. Readily available training, including Internet training, and the common code format used by the ICC is familiar to Lawrence users and will facilitate the transition.

H. Public Comments

During the course of meetings held by the CRC, two opportunities were included in the schedule for meetings devoted to receiving public comment. The following summarizes the comments received at those meetings.

September 30, 2003

Minutes of the meeting can be viewed at the Neighborhood Resources Department website at www.lawrenceneighres.org. One comment noted the lack of a residential code and energy component in the NFPA set of codes. A couple of comments referred to the ICC codes as being more user-friendly in the transition between the UBC and the IRC. The comments received were predominately in favor of adopting the ICC set of codes.

January 29, 2004

Minutes of this meeting can be viewed at www.lawrenceneighres.org**.** There appeared to be a common thread throughout the public comments received at this meeting. There was a concern that the adoption of a new family of codes would "lower the bar" for code enforcement and create life and safety issues for the community. When discussing these comments at the CRC's final meeting on February 11, 2004, the Committee members were sensitive to the concerns of the members of the public. However, it was a CRC consensus that the various trade boards would review the applicable ICC code set (IPC, IMC, IRC, etc.) and make the technical comparisons between the ICC codes and the existing code and make whatever amendment recommendations would be necessary to maintain a building code standard that speaks to the life and safety issues that have been acceptable to the Lawrence community in the past.

IV. Recommendation and Committee Comments

On January 14, 2004 the CRC voted without opposition to recommend to the City Commission that the ICC code set, including the IBC, IFC, IRC, IMC, IPC, and International Fuel-Gas Code be adopted by the City of Lawrence. Comments given by the various committee members for justification of this action include:

- The ICC has a more established record of producing and supporting building codes.
- Research reports and product information for new materials and designs is available through the ICC.
- The ICC is less prone to special interest while developing code.
- Transition to the ICC codes will be easier because these codes utilize the common code format used in the predecessor codes that is familiar to code users in Lawrence. The

common format and greater resemblance to the UBC currently enforced will result in a shorter learning curve.

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- It was mentioned during the NFPA presentation the NFPA is close to including regulations to require fire sprinkler systems in single-family residences. There was concern that such a requirement would increase the challenge of providing affordable housing.

- One single set of codes would be beneficial to staff, engineers and architects, and other users. NFPA is still a new code and some issues still need to be worked out while the ICC has the support of professional organizations, such as the American Planning Association and the American Institute of Architects.

V. Recognition

Staff from the Codes Enforcement division (Neighborhood Resources Department) and Fire Prevention division (Fire and Medical Department) wish to recognize and express appreciation for the dedication and commitment of the members of the CRC for the time and effort given in this review of the code organizations. All committee members have been active participants and have expressed opinions that have been invaluable to the process and the production of this final report and recommendation.

Abbreviations used in this report-
AHJ - Authority having jurisdiction
CABO - Council of American Building Officials
CED - Codes Enforcement Division
CRC - Code Review Committee
IBC - International Building Code
ICC - International Code Council
IFC - International Fire Code
IMC - International Mechanical Code
IRC - International Residential Code
NEC - National Electrical Code
NFPA - National Fire Protection Association
NFPA - 5000 National Fire Protection Association Building Code
NFPA 1/UFC - National Fire Protection/Uniform Fire Code
UBC - Uniform Building Code
UFC - Uniform Fire Code