

NFPA 1402

Guide to Building Fire Service Training Centers

2007 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA DOCUMENTS

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF NFPA DOCUMENTS

NFPA codes, standards, recommended practices, and guides, of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its codes and standards.

The NFPA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making this document available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the NFPA list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

ADDITIONAL NOTICES AND DISCLAIMERS

Updating of NFPA Documents

Users of NFPA codes, standards, recommended practices, and guides should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments. An official NFPA document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at www.nfpa.org, or contact the NFPA at the address listed below.

Interpretations of NFPA Documents

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing Committee Projects shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Patents

The NFPA does not take any position with respect to the validity of any patent rights asserted in connection with any items which are mentioned in or are the subject of NFPA codes, standards, recommended practices, and guides, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on these documents. Users of these documents are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

NFPA adheres to applicable policies of the American National Standards Institute with respect to patents. For further information contact the NFPA at the address listed below.

Law and Regulations

Users of these documents should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the NFPA. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making this document available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to this document.

Use of NFPA documents for regulatory purposes should be accomplished through adoption by reference. The term “adoption by reference” means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA documents, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA codes, standards, recommended practices, and guides and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA documents during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

For more information about NFPA, visit the NFPA website at www.nfpa.org.

Copyright © 2007 National Fire Protection Association. All Rights Reserved.

NFPA 1402
Guide to
Building Fire Service Training Centers
2007 Edition

This edition of NFPA 1402, *Guide to Building Fire Service Training Centers*, was prepared by the Technical Committee on Fire Service Training. It was issued by the Standards Council on December 1, 2006, with an effective date of December 20, 2006, and supersedes all previous editions.

This edition of NFPA 1402 was approved as an American National Standard on December 20, 2006.

Origin and Development of NFPA 1402

In 1963, a subcommittee of the Fire Service Training Committee developed a document titled *How to Build Firemen's Training Centers*. That informative report was published and circulated as a guide and served to improve the scope and efficiency of fire fighter training. By 1985, the report had evolved into the first edition of NFPA 1402, *Guide to Building Fire Service Training Centers*. Revisions to NFPA 1402 were published in 1992 and 1997.

The Fire Service Training Committee appointed a Task Group to review the 1997 edition and make recommendations concerning the functionality of the document. After that review, the Task Group recommended a general updating of NFPA 1402, which was undertaken for the 2002 edition.

In addition to minor edits to address the general evolution of the subject, the Committee placed more emphasis in the 2002 edition on needs analysis before design and construction, establishing policies and procedures for effective use of the structure, and the environmental impact of training and training props.

New material was added to the chapter on gas-fired burn props. The chapter on design and construction was renamed "Selecting an Architect/Engineer (A/E)" and placed more emphasis on the important roles played by these professionals and on the contract documents that form the foundation of projects for building fire service training centers. The chapter on burn buildings was renamed "Live Fire Training Structure" and placed more attention on these structures, especially regarding the impact of repeated high temperatures.

The 2007 edition of the guide includes updated material on needs and cost analysis, training center components and considerations, and infrastructure considerations and exposures. The guide also includes many new and updated illustrations.

In Memoriam, September 11, 2001

We pay tribute to the 343 members of FDNY who gave their lives to save civilian victims on September 11, 2001, at the World Trade Center. They are true American heroes in death, but they were also American heroes in life. We will keep them in our memory and in our hearts. They are the embodiment of courage, bravery, and dedication. May they rest in peace.

Technical Committee on Fire Service Training

William E. Peterson, *Chair*

U.S. Department of Homeland Security, TX [E]
Rep. International Fire Marshals Association

Roger W. Bassett, R. W. Bassett & Associates, IL [SE]

Theron J. Becker, City of Bolivar Fire Department,
MO [U]

John M. Best, John Jay College of Criminal Justice,
MD [U]

Donald T. Brady, Kidde Fire Trainers, Incorporated,
NJ [M]

W. Edward Buchanan, Jr., Hanover Fire & EMS, VA [U]

James R. Eddy, New England Fire Cause & Origin,
Incorporated, NH [SE]

William E. Glover, High Temperature Linings (HTL),
VA [U]

David C. Grupp, Gilberts, IL [SE]

George F. Hall, U.S. Air Force, FL [U]

John W. Hoglund, Maryland Fire & Rescue Institute,
MD [E]

Larry D. Hughes, North Carolina Department of
Insurance, NC [E]

Cortez Lawrence, U.S. Department of Homeland
Security, MD [SE]

Roger M. LeBoeuf, Elliott, LeBoeuf & Associates,
VA [SE]

John B. Lockwood, Bowie, MD [SE]

Lavarn E. Lucas, Hilton Head Island Fire & Rescue,
SC [E]

Denis M. Murphy, Nassau County Fire Service Academy,
NY [U]

John Mike Myers, Las Vegas Fire Rescue, NV [E]

Rodney D. Reid, RATIO Architects, Incorporated,
IL [SE]

Kenneth W. Richards, Jr., Old Mystic Fire Department,
CT [E]

Daniel N. Rossos, City of Portland Fire Bureau, OR [E]

Gary A. Simpson, E. D. Bullard Company, KY [M]

Frederick M. Stowell, Fire Protection Publications,
OK [M]

Rep. International Fire Service Training Association

Richard Verlinda, Seattle Fire Department, WA [E]

Phil Welch, Gaston College, NC [U]

Gary M. Young, City of Yuma Fire Department, AZ [E]

Alternates

Denis G. Onieal, U.S. Department of Homeland
Security, MD [SE]

(Alt. to C. Lawrence)

Michael A. Wieder, Fire Protection Publications, OK [M]

(Alt. to F. M. Stowell)

Steven J. Williamson, Kidde Fire Trainers, Incorporated,
NJ [M]

(Alt. to D. T. Brady)

Nonvoting

Edward W. Bent, Sacramento, CA
(Member Emeritus)

David G. Trebisacci, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for all fire service training techniques, operations, and procedures to develop maximum efficiency and proper utilization of available personnel. Such activities can include training guides for fire prevention, fire suppression, and other missions for which the fire service has responsibility.



Contents

Chapter 1 Administration	1402- 5	8.8 Audiovisual Support	1402-13
1.1 Scope	1402- 5	8.9 Printing Room	1402-13
1.2 Purpose	1402- 5	8.10 Graphic Unit	1402-13
1.3 Application	1402- 5	8.11 Simulator Facility	1402-13
Chapter 2 Referenced Publications	1402- 5	8.12 Locker and Shower Facilities	1402-13
2.1 General	1402- 5	8.13 Cleanup and Drying Room	1402-14
2.2 NFPA Publications	1402- 5	8.14 Arson Lab	1402-14
2.3 Other Publications	1402- 5	8.15 Emergency Care	1402-14
2.4 References for Extracts in Advisory Sections	1402- 5	8.16 Building Maintenance	1402-14
Chapter 3 Definitions	1402- 5	8.17 Observation/Control Tower	1402-14
3.1 General	1402- 5	8.18 Miscellaneous	1402-14
3.2 NFPA Official Definitions	1402- 5	Chapter 9 Drill Tower	1402-14
3.3 General Definitions	1402- 5	9.1 General	1402-14
Chapter 4 Needs Analysis	1402- 5	9.2 Height	1402-16
4.1 General	1402- 5	9.3 Construction	1402-16
4.2 Alternative Facilities	1402- 6	9.4 Dimensions	1402-16
4.3 New Fire Service Training Center	1402- 6	9.5 Stairways	1402-16
Chapter 5 Components and Considerations	1402- 6	9.6 Exterior Openings	1402-16
5.1 General	1402- 6	9.7 Fire Escapes	1402-16
5.2 Donated Land, Buildings, Training Structures, and Training Props	1402- 7	9.8 Sprinkler and Standpipe Connections	1402-16
5.3 Planning Considerations	1402- 7	9.9 Roof Openings	1402-17
5.4 Usage Guidelines	1402- 8	9.10 Coping	1402-17
Chapter 6 Infrastructure Considerations and Exposures	1402- 8	9.11 Nets	1402-17
6.1 General	1402- 8	9.12 Drains	1402-17
6.2 Site Considerations	1402- 8	9.13 Sprinkler Laboratory	1402-17
6.3 Water Supply	1402- 9	9.14 Alarm System Laboratory	1402-17
6.4 Security	1402- 9	9.15 Fire Extinguishing Systems	1402-17
6.5 Environment	1402- 9	9.16 Special Training Features	1402-17
6.6 Utilities	1402-10	Chapter 10 Live Fire Training Structure	1402-18
6.7 Support Services	1402-10	10.1 General	1402-18
Chapter 7 Selecting an Architect/Engineer (A/E)	1402-10	10.2 Fire Temperature	1402-19
7.1 General	1402-10	10.3 Instrumentation	1402-19
7.2 A/E Qualifications and Requirements	1402-10	10.4 Built-In Safeguards	1402-19
7.3 Clerk of the Works/Owner's Project Manager	1402-11	10.5 Cutouts	1402-20
Chapter 8 Administration/Classroom Building	1402-11	10.6 Gas-Fired Live Fire Training Structures	1402-20
8.1 General	1402-11	10.7 Doors and Shutters	1402-21
8.2 Offices	1402-11	10.8 Sprinklers	1402-21
8.3 Conference Room	1402-11	Chapter 11 Smoke Building	1402-21
8.4 Auditorium	1402-11	11.1 General	1402-21
8.5 Classrooms	1402-12	11.2 Flexibility	1402-21
8.6 Library	1402-12	11.3 Safety	1402-21
8.7 Kitchen, Cafeteria, and Break Room	1402-12	11.4 Smoke	1402-21
		Chapter 12 Combination Buildings/Training Structures	1402-22
		12.1 General	1402-22
		Chapter 13 Outside Activities	1402-23
		13.1 General	1402-23

13.2	Flammable Liquids and Flammable Gases	1402-23	Chapter 14 Mobile Training Props	1402-28
13.3	Electrical	1402-25	14.1 General	1402-28
13.4	Drafting Pit	1402-26	14.2 Types of Units	1402-28
13.5	Apparatus Driver Training Course	1402-26	14.3 Vehicle Design	1402-29
13.6	Hazardous Materials Containment and Decontamination Areas	1402-27	14.4 Emergency Response Capability	1402-29
13.7	Outside Classrooms	1402-27	14.5 Problems to Be Identified	1402-29
13.8	Technical Rescue Team Functions	1402-27	14.6 Operating Costs	1402-29
13.9	Mock City	1402-28	Annex A Explanatory Material	1402-30
13.10	Fire Behavior Lab ("Flashover Container")	1402-28	Annex B Informational References	1402-30
			Index	1402-31

NFPA 1402**Guide to****Building Fire Service Training Centers****2007 Edition**

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading “Important Notices and Disclaimers Concerning NFPA Documents.” They can also be obtained on request from NFPA or viewed at www.nfpa.org/disclaimers.

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in advisory sections of this document are given in Chapter 2 and those for extracts in the informational sections are given in Annex B. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text should be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1 Scope. This guide addresses the design and construction of facilities for fire service training. It covers the aspects that should be considered when planning a fire service training center. It should be understood that it is impractical to list every item that might be included in a training center or every type of specialty training facility that might be constructed. Therefore, the main components of a training center necessary to accomplish general fire fighter training effectively, efficiently, and safely are presented here.

1.2 Purpose. This document provides guidance for the planning of fire service training centers. Regardless of whether a particular situation requires inclusion of all the items specified, they are provided to provoke thought. This guide is intended to assist in the identification of those elements that are of the greatest benefit to those involved in planning and constructing training centers.

1.3 Application. Some of the structures in a fire service training center are designed to be training props and are not required to meet all of the requirements of the jurisdiction's building codes. However, the structural integrity of all training structures and props must be ensured.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this guide and should be considered part of the recommendations of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 2007 edition.

NFPA 54, *National Fuel Gas Code*, 2006 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2004 edition.

NFPA 59, *Utility LP-Gas Plant Code*, 2004 edition.

NFPA 70, *National Electrical Code*®, 2005 edition.

NFPA 72®, *National Fire Alarm Code*®, 2007 edition.

NFPA 86, *Standard for Ovens and Furnaces*, 2007 edition.

2.3 Other Publications.

2.3.1 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 508, *Standard for Industrial Control Equipment*, January 1999.

2.3.2 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Advisory Sections.

NFPA 101®, *Life Safety Code*®, 2006 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter apply to the terms used in this guide. Where terms are not defined in this chapter or within another chapter, they should be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, is the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1 Guide. A document that is advisory or informative in nature and that contains only nonmandatory provisions. A guide may contain mandatory statements such as when a guide can be used, but the document as a whole is not suitable for adoption into law.

3.2.2 Should. Indicates a recommendation or that which is advised but not required.

3.3 General Definitions.

3.3.1 Means of Escape. A way out of a building or structure that does not conform to the strict definition of means of egress but does provide an alternate way out. [**101**, 2006]

Chapter 4 Needs Analysis

4.1 General. Fire service training programs should be analyzed to determine the type of training that is required. Is a fire service training center necessary? If the answer is yes, then the initial step is to develop a statement on the broad purpose of the center. An example of such a statement follows: “Ever-changing technologies in fire suppression and fire prevention require that today's fire fighter be knowledgeable and well trained. A proper environment for obtaining this knowledge and training is equally important. This fire service training center provides the facilities required for fire training and enhances the community's well-being through better fire protection and fire prevention.”

4.1.1 The construction of a fire service training center, regardless of its size, involves planning, design, and the expenditure of funds. In order to maximize benefits from the resources available, an assessment of current and future needs should be made. This assessment should consider the following:

- (1) Current and future training needs
- (2) Facilities currently available
- (3) Organizations or departments using the training center, including potential teaming partners from around the region
- (4) Viable alternatives to new construction
- (5) Fuel sources
- (6) Land availability
- (7) Suitability of land for purpose
- (8) Future plans for land adjoining the facility

4.1.2 The resources available will define the limitations of facility development and construction. Resources include money, land, and support from the government, private enterprise, and the community. Questions concerning the availability of resources should be answered during the planning of a training center.

4.2 Alternative Facilities. If a fire department requests a new training center, its existence needs to be justified. The use of existing facilities at the state or regional level should be explored. If the department is located in an industrial area, the possibility of using the fire training facilities of the local plants should be considered.

4.3 New Fire Service Training Center. If it is decided that a new fire service training center is to be built, certain factors need to be considered.

4.3.1 Cost Considerations. The question of who is to assume the cost must be asked. Both initial and ongoing costs need to be identified, including the following:

- (1) Site acquisition
- (2) Fees (legal, permitting, and architectural)
- (3) Construction
- (4) Furnishings
- (5) Staffing
- (6) Apparatus and equipment
- (7) Maintenance (buildings, grounds, training props, and equipment)
- (8) Utilities (water, electricity, gas)
- (9) Fuel
- (10) Noise, smoke, and water abatement
- (11) Roadway systems

4.3.2 Cost-Benefit Analysis.

4.3.2.1 A cost-benefit effectiveness analysis should be conducted to enable a community to determine whether the investment is cost-effective and if it is feasible to contribute to long-range financial support. This analysis should include consideration of cost-saving opportunities, such as determining which departments and agencies will use the training center, so that costs can be shared by multiple budgets; identifying state, county, and regional training agencies that might wish to sponsor their programs at the training center; and finding local industrial plants that might be willing to contribute to the costs of the training center. An example of one of these options is that local police might share a need for driver training, physical fitness, tower training, and use of various spaces, such as auditoriums, classrooms, offices, and conference rooms. Another example is combining the training center

with an in-service fire station, which could satisfy two needs and reduce the total financial impact of separate facilities.

4.3.2.2 Finding ways to reduce construction, operations, and maintenance costs should be part of the cost-benefit analysis. Modular construction, including pre-engineered structures, could be cost-effective for training structures and for administration, classroom, storage, and other facilities. Exploring various site layouts, construction phasing, grant opportunities, and alternatives for training props should be part of the analysis.

4.3.2.3 The cost-benefit analysis should include an evaluation of potential cost savings for current training expenditures that might not be necessary if a training center is built. Examples include the following:

- (1) Fees paid to use facilities at other training centers
- (2) Travel costs, such as fuel, overtime pay, lodging, and per diem, associated with training at other training centers
- (3) Costs associated with preparing acquired structures for training evolutions

4.3.3 Intangible Benefits. Potential intangible benefits could help a community accept the need for building a new training center. It might be beneficial to organize a commission or advisory group to interface between governing bodies and the fire training agency. The group should include representatives of the agencies, organizations, and departments that will use the training center. Such a group could weigh the importance of the following potential benefits:

- (1) Reduced injuries and deaths of civilians and fire fighters
- (2) Reduced number of fires and property damage
- (3) Increased efficiency and morale of the fire-fighting force
- (4) Improved training capability and public image of the fire department

Chapter 5 Components and Considerations

5.1 General. This chapter lists general components that could be part of a training center. Other components that might be unique to a particular area of industry are not included. For the purpose of this guide, the buildings, training structures, and training props are discussed separately; however, combinations of these components might be necessary or advantageous. As long as the function of an individual component is not compromised, each component can be located wherever it is conducive to effective training and safety. The installation of all components is not necessary for an efficient training center. The following list of components should be considered:

- (1) Administration and support facilities components, as follows:
 - (a) Offices
 - (b) Conference areas
 - (c) Library
 - (d) Photo laboratory and darkroom
 - (e) Printing and copying area
 - (f) Graphics and audiovisual aid preparation area
 - (g) Student housing, dorms, and recreation facilities
 - (h) Food service facilities, cafeteria, kitchenette, or break room
 - (i) Restroom and locker facilities
 - (j) Apparatus maintenance and repair center

- (k) Equipment and supply facility
- (l) Storage space for various materials
- (m) Communications center
- (n) Data processing area
- (o) Medical area, infirmary, or first aid
- (p) Records storage
- (q) Computer facilities
- (r) Video production area
- (s) Multimedia facilities
- (t) Internet connections
- (u) Broadcasting capabilities
- (v) Self-contained breathing apparatus (SCBA) maintenance, repair, and refilling area
- (2) Indoor instructional facilities components, as follows:
 - (a) Classrooms (“clean” and “dirty”)
 - (b) Breakout areas for classes
 - (c) Auditorium
 - (d) Physical fitness area
 - (e) Pool for water rescue training
 - (f) Technical rescue training areas
 - (g) Special training laboratories components, as follows:
 - i. Simulators
 - ii. Automatic sprinklers
 - iii. Pumps
 - iv. Emergency medical services (EMS) and rescue
 - v. Fire alarm systems
 - vi. Arson laboratory
 - (h) Infrastructure for recording classroom sessions and for distance learning equipment
 - (i) Storage space for equipment and props
- (3) Outside facilities components, as follows:
 - (a) Drill tower
 - (b) Drafting pit
 - (c) Live fire training structure
 - (d) Emergency vehicle operations course (EVOC) — driver training area
 - (e) Flammable liquids and gases and fuel distribution area for outdoor gas-fired props, such as the following:
 - i. Fuel spill fire
 - ii. Vehicle fire (car, bobtail truck, other)
 - iii. Dumpster fire
 - iv. LP tank fire
 - v. Gas main break fire
 - vi. Christmas tree fire
 - vii. Industrial fire
 - (f) Hazardous materials containment and decontamination areas
 - (g) Outside classroom areas (could combine with rehabilitation areas, storage space, and/or restrooms)
 - (h) Helicopter landing site
 - (i) Respiratory protection training laboratory
 - (j) Storage space for portable equipment, vehicles, and props
 - (k) Bleachers for outdoor classes or observation of drill tower activities
 - (l) Fire station
 - (m) Outside rehabilitation areas (could combine with outside classroom, storage space, and/or restrooms)
 - (n) Technical rescue area (e.g., high angle, collapse, trench, confined space, vehicle extrication)
 - (o) Safety monitoring and control areas
 - (p) Rail incident training (with or without fire)
 - (q) Aircraft incident training (with or without fire)
 - (r) Shipboard incident training (with or without fire)
 - (s) Fire behavior laboratory (“flashover container”)
 - (t) Extinguisher training
 - (u) Swift water rescue training
 - (v) Rapid intervention training (RIT) (“Saving Your Own”) training prop
 - (w) Mock city (with or without fire) — could also be used for multiagency training
- (4) Infrastructure components, as follows:
 - (a) Water distribution, sewer, and other utilities
 - (b) Parking facilities (open and covered)
 - (c) Site maintenance equipment and facilities
 - (d) Environmental cleanup activities
 - (e) Communications
 - (f) Water filtration and reclamation
 - (g) Security infrastructure for site, buildings, storage areas, and training grounds

5.2 Donated Land, Buildings, Training Structures, and Training Props. Fire departments are sometimes offered donations of land, buildings, or existing facilities that could be converted into training structures or training props. Such donations should be evaluated before being accepted to ensure that the training, operational, and budgeting needs can be fulfilled safely and in a practical manner. In some cases, the department might not be able to afford the donation, or the donation might not be suitable. The following questions should be considered before accepting donations:

- (1) Is the donated land going to be difficult and/or expensive to develop due to any of the following:
 - (a) It is an old landfill.
 - (b) It contains hazardous materials.
 - (c) It includes wetlands.
 - (d) It has poor soils that cannot support buildings.
 - (e) It includes rock that will be expensive to excavate.
 - (f) It is an endangered species habitat or a wildlife preserve.
 - (g) It is located in a flood plain.
 - (h) It is historic property with developmental restrictions.
 - (i) It is located adjacent to neighbors who cannot tolerate noise, smoke, lights at night, or other disruptions inherent in fire training.
 - (j) It is not located near sources of water, power, sewer, or other utilities.
 - (k) It poses other problems that would make it difficult or expensive to develop.
- (2) Is the donated structure in good structural condition and suitable for conversion into a fire training structure or prop?
- (3) Is the structure suitable for live fire training, rappelling, and other types of training?
- (4) Is the donated building in good condition and free of asbestos, lead, or other hazardous materials?
- (5) Is the building free of structural deficiencies, termites, mold, roof leaks, or other problems that could be expensive to repair?
- (6) Will the building code allow the building to be converted into a classroom or administration building?

5.3 Planning Considerations. Because a training center is a specialized facility, there are a number of specific features that should be considered. Since a training center will probably be expected to be used for 40 or 50 years, it is desirable to rely on the experience gained by others. The remaining chapters of

this document provide some specific areas of guidance, and the following general guidelines also should be considered:

- (1) Conflicts with the local area master plan and zoning criteria should be avoided.
- (2) Possible joint use with other agencies should be investigated.
- (3) Available grant funds should be explored.
- (4) An environmental impact statement should be developed.
- (5) Existing training centers should be visited for ideas and experience; new training centers might exhibit state-of-the-art features, while older training centers might identify operational and/or maintenance problems to be avoided.
- (6) Weather-related problems and the effects of seasonal use should be considered.
- (7) That part of the training center, if any, to be used at night should be determined.
- (8) Ample space should be provided between buildings/outdoor facilities to enable simultaneous use.
- (9) Ample, secured storage space should be provided for each segment of the training center.
- (10) Site landscaping with minimum upkeep that complements the training activities and that buffers the site from neighbors should be selected.
- (11) Interior/exterior finishes that require a minimum of maintenance should be chosen.
- (12) Heating and air-conditioning equipment should be located where regular maintenance can be performed easily, but the installation of individual units in classroom areas should be avoided.
- (13) Separate locker and restroom facilities should be provided for male and female occupants, and separate facilities should be provided for staff and students.
- (14) The space needed for guests and visitors, staff, and future users should be identified.
- (15) Slip-resistant surfaces should be specified for all stairs and well-traveled paths.
- (16) Automatic sprinklers and smoke detectors should be specified for appropriate areas.
- (17) Facilities should be provided for the storage of fuel used in training.
- (18) Facilities should be provided for the refueling of apparatus.
- (19) Communications should be provided between structures and training areas.
- (20) Storage for apparatus, especially during cold weather, should be provided.
- (21) Drinking water facilities should be provided at all drill sites, including those outdoors.
- (22) Emergency shower and eye wash stations should be provided.
- (23) Lighting should be provided in as many areas of the buildings, props, and training grounds as practical to assist in locating personnel.
- (24) An intercom system that could be used throughout the training center should be installed.
- (25) Budgets should be established for construction, operations, and maintenance.

5.4 Usage Guidelines. Policies and procedures should be developed regarding the use of the training center. The needs of the prospective users should be fulfilled by proper scheduling. User insurance coverage should be verified before any use is authorized. Careful explanation of the usage guidelines should be given to all instructors, guest instructors, and other users. Formal training should be provided to all instructors and safety officers who use the training center, especially with

respect to live fire training structures and props, and the following actions should also be taken:

- (1) Be certain to provide a tour and specify where fires are to be lighted and the maximum amount of combustibles to be burned.
- (2) Make sure participants know how to report damage to the training structures and props, as well as any injuries that occur during the training activities.
- (3) Ensure that facilities with computer-controlled gas-fired burn props have qualified operator and maintenance personnel available.
- (4) Include a package of material that contains all important phone numbers, contact personnel, and required forms.

Chapter 6 Infrastructure Considerations and Exposures

6.1 General. Certain factors that should be considered in determining the location of the training center in the community include the site, water supply, environment, security, support services, and access to utilities.

6.2 Site Considerations.

6.2.1 Some questions that should be asked when considering site locations include the following:

- (1) What land is available?
- (2) Does the agency own land that could be considered as a site?
- (3) Are there abandoned properties available?

6.2.2 The cost of the land should be included in the agency's budget. A sequential spending plan might allow for the purchase of the necessary land one year and the construction of certain buildings thereafter. A sequential plan could enable the community to realize its objective over an extended period of time rather than placing pressure on current resources for immediate large expenditures. On the other hand, using a bond issue to build at the current year's rate and paying off with future dollars could be more cost-effective. Financial consultation is recommended.

6.2.3 An architect/engineer (A/E), a civil engineer, or the municipality's staff engineer should be consulted during planning stages, before land is acquired, to determine if there are potential issues that could make the land difficult and/or expensive to develop, such as wetlands, environmental issues, endangered species habitats, wildlife preserves, flood plains, and the presence of hazardous materials.

6.2.4 Hidden subsurface conditions could pose logistical and budget problems. A geotechnical engineer should be consulted during planning stages to determine if the soils are suitable for supporting buildings and paving and to identify potential hidden problems, such as rock, loose fill, ledge formations, or a high water table.

6.2.5 The area master plan, if one exists, should be taken into consideration. The site of the training center should be located as follows:

- (1) Away from the center of community life to minimize negative impact on adjacent land use
- (2) As centrally located as possible for the departments and personnel that will be using it, to minimize travel time and remoteness from protection districts



6.2.6 If a favorable site requires a plan variance, all pertinent facts should be gathered, and a presentation should be made to the planning board. If possible, the area master plan should be used to support the agency's advantageous position. The voting public should be informed of the advantages of the training center, and every effort should be made to develop public support.

6.2.7 The title to the property should be clear. The potential for future expansion is often desirable, so the surrounding land should be surveyed. A land use determination from the planning board for fire training is beneficial. This requires the municipality to check with the agency before allowing other types of usage. If possible, the site should be marked prominently on land maps and should be surrounded by a nonresidential area. A lawyer's guidance could be advantageous in such cases.

6.2.8 Vehicle traffic patterns should be studied, and the most convenient route to the training center should be identified. Heavy, noise-producing apparatus should be routed to avoid residential areas. Travel time to the training center for users should be taken into consideration. On-duty personnel who are receiving in-service training at the training center could be required to respond to emergency incidents; therefore, the training center should be located so that it is accessible to appropriate emergency response routes.

6.2.9 The size of the site should be ample for planned buildings, training structures and props, parking, and future expansion. Adequate separation should be planned between buildings, training structures, and props for safety, vehicular movement, and instructional purposes. In some cases, it might be better to conserve on the size of structures than to overcrowd limited land.

6.2.10 Site pavement should be such that the training center can be used in all kinds of weather. Any pavement will deteriorate, especially when subjected to hydrocarbons or hot exhausts. Concrete pavement withstands training center usage with minimum maintenance.

6.2.11 Landscaping and site layout should take into consideration local climatic conditions. Consideration should be given to rain, snow, wind, heat, and other adverse elements that could affect facility operations. Site layout could incorporate a roadway system that is typical of the community. This could be helpful in the training of apparatus operators.

6.3 Water Supply.

6.3.1 The maximum water supply required should be estimated so that an adequate system is installed to deliver the necessary water volume and pressure for training activities, facility fire protection systems, and domestic water needs. Water supply estimates should include the amount of water used in attack lines, backup lines, and drafting and pumping exercises, with an additional 100 percent included as a safety factor. A loop or grid system with properly placed valves could help to ensure adequate water delivery. Dead-end mains should be avoided. Valves should be placed to segregate sections of the water system to allow for repairs without complete shutdown.

6.3.2 The type of hydrant(s) installed at the training center should be representative of types found in the community. Where more than one community uses the training center and the hose threads are not uniform, a variety of fittings with appropriate threads should be provided.

6.3.3 Even where there is a hydrant system, drafting could provide an additional source of water. During times of water

emergency, drafting might be necessary. Lakes or ponds, streams, man-made containers, and dry hydrants are potential drafting sources. Consideration should be given to supplying water from the water distribution system to maintain the water level in the drafting pit.

6.3.4 The on-site water supply needs should be determined and storage containers constructed, if necessary. Elevated, surface, or underground storage could be used. Pumps also could be used to move water at the desired pressure.

6.3.5* For durability, the water main should meet the requirements of NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, and be constructed with bolted flanges or steel-rod joints. If severe turns have to be engineered into the piping, consideration should be given to thrust blocks. Flanges and joints both help overcome the effect of water hammer.

6.3.6 Tank trucks or long relays could be used to provide water for training. However, this practice increases the number of vehicles and personnel needed to accomplish basic evolutions, and it further increases the vehicular accident potential and maintenance cost.

6.3.7 A pumper test pit could be used as a cistern if water mains are not available.

6.3.8 A runoff settling pond equipped with a dry hydrant could be used as a water source.

6.4 Security.

6.4.1 The training center should be secure. The site should be fenced and well lighted, and, if necessary, a guard should be provided. Local police could make the training center a part of their rounds. Security could be augmented by alarm systems with connections to appropriate monitoring stations. Buildings, training structures, elevator shafts, drafting pits, underground utility covers, and all exterior valves and cabinets should be locked.

6.4.2 An evacuation signaling system and an automatic fire detection and alarm system should be installed throughout the training center in accordance with NFPA 72, *National Fire Alarm Code*. A central station connection should be provided where a 24-hour guard is not posted at the control/monitor center.

6.5 Environment.

6.5.1 Federal, state, and local environmental protection agencies should be consulted. The results of these consultations could facilitate procurement of the necessary permits and licenses. These consultations should address the problem of waste water (treatment and disposal) and pollution (air, water, and noise). The facts gleaned from these agency contacts could be of use when the A/E is consulted.

6.5.2 When selecting a site for a training center, there are environmental factors to consider. It is important to ensure that the training center is environmentally safe. Factors that should be considered from an environmental aspect are water, air, and the ground (soil).

6.5.2.1 There are governmental agencies that have a jurisdictional interest in the location, design, and construction of a training center. These include agencies at the federal level, such as the Army Corps of Engineers and the Environmental Protection Agency. Each state or municipality, or both, also has regulatory agencies from which approval might be necessary