Department of Defense
Legacy Resource Management Program

Project 07-382:

Design Guidelines for Department of Defense Historic Buildings and Districts

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MANAGEMENT SUMMARY

Legacy Project 07-382, *Design Guidelines for DoD Historic Buildings and Districts,* was created to assist the Department of Defense (DoD) with its Cultural Resources stewardship. In compliance with the National Historic Preservation Act of 1966 (NHPA) DoD is required to consider the effect of its actions on historic buildings and districts within its holdings. NHPA is codified in Federal Regulations under 36 CFR 800. *Design Guidelines for DoD Historic Buildings and Districts* (Guidelines) is designed to assist everyone at the installation level and beyond who has dealings with historic buildings. The Guidelines are not meant to replace the role of the architectural historian or historic architect. Having trained and experienced professionals on the installations is the best means of communicating with all of the parties involved and protecting our historic properties. The Guidelines are also not meant to replace guidance from the State Historic Preservation Office (SHPO). However, the Guidelines will assist people who work on installations, but who are not trained in historic architecture by providing a better understanding of why it is important to preserve these valuable cultural resources, what the resources are, the vocabulary that describes the resources, and how to interpret the Secretary of the Interior's Standards to appropriately manage these resources.

The Guidelines are divided into three distinct sections. The first section is the Overview, which includes Cultural Resources Management, Mission and Goals, Historical Background and Context, and Architectural Influences. The Overview discusses cultural resources management at various levels; DoD, individual military services (Air Force, Army, Navy, and Marine Corps), installation level, building users and tenants. Mission, goals, legal requirements and compliance are also included in this section. The historical background and context is a brief history of the United State military and the development of our nation's military installations. It is not meant to be a complete history but rather to provide context and background in this document; sources for additional history are provided in the appendices. The last section in the Overview is Architectural Influences. Here the reader can find a description of architectural influences and regional or vernacular variations, military architecture and the use of standardized plans. Finally, an illustrated guide to military architecture is included with listings of character-defining features to assist the user and reader with identification, thereby assisting them in the management process.

The second section of the document presents the actual design guidelines. They are broken down into six sub-sections; Site and Setting, Building Exterior, Building Interior, Additions and New Construction, Additional Guidelines, and Demolition and Relocation. Each subsection is formatted similarly, with the first page having a description of the feature and a statement of its significance along with one or two illustrations. The second page lists the actual guidelines. The guidelines language follows the Secretary of the Interior's Standards. The first step is always to preserve and retain a feature or detail; the next step is to repair rather than replace, then finally, if replacement is necessary, replace with a component that matches the original. Whenever possible, additional illustrations and explanations have been added to provide information and vocabulary to create a better understanding of the guidelines. There is redundancy within the pages of the design guidelines. In addition to the sections being similarly

written every section recommends that the users follow installation protocol and consult with the SHPO. We did this so that if only one section of design guidelines, for example, windows and doors, is copied for an architect or contractor the section can stand on its own.

The final section of the Guidelines is the Additional Information section. The works consulted, list of acronyms, glossary, sources for technical assistance, and sources for additional information can be found here. There are several topics that require in-depth research that could not be provided under the scope of this project; in those cases, we have included sources for additional information. This section also includes websites for the National Park Service Preservation Briefs and Tech Notes, Leadership in Energy and Environmental Design (LEED), National Trust for Historic Preservation, and more.

It is important to note that there are several moving targets, where final information was not available upon publication of the guidelines. LEED, Sustainability, Green Building are all current phrases used to describe increased energy efficiency and reductions in adverse environmental impacts in today's construction. At publication, there is not a LEED standard for historic buildings. There is a standard in development but to date it does not exist. Therefore, we have included a chapter on LEED and sustainability under Utilities and Energy Efficiency and we have included sources for the most up-to-date information. This also holds true for Antiterrorism/ Force Protection standards. New requirements change quickly, so we have tried to include the most current information available to us and sources for additional information and updates. Finally, we have included a set of guidelines for archaeology. These guidelines are not intended for the management of archaeological resources but rather to provide assistance for the protection and preservation of archaeological resources during rehabilitation and new construction projects located in or adjacent to historic buildings and districts.

Design Guidelines for DoD Historic Buildings and Districts is meant to be a comprehensive, user-friendly, well-illustrated handbook of historic building preservation on military installations. The goal was to create a handbook that a person without expertise in the field of building preservation could go to for guidance when interpreting the Secretary of the Interior's Standards and communicating those standards to others inside and outside the organization. With the guidelines in-hand, cultural resources managers, planners, project managers, architects, engineers, contractors, and tenants will have upfront guidance at the planning level so that adverse effects can be avoided prior to consultation with the SHPOs, thereby eliminating costly delays to better support the mission while preserving our country's historic buildings and districts.

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SECTION II. DESIGN STANDARDS AND GUIDELINES

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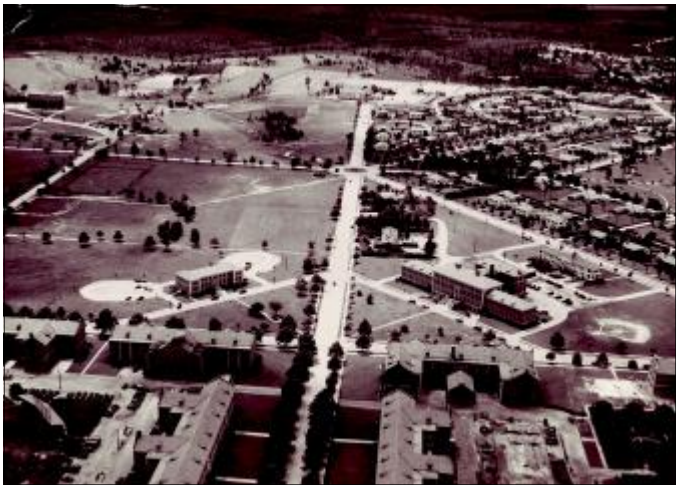


Documentary aerial showing the 1930s appearance of the Old Post Historic District, Fort Bragg, North Carolina. National Archives RG-342 FH, Box 1060-B17347

Background

Department of Defense (DoD) installations strive to be good stewards of the environment through the proper management of their natural and cultural resources. This handbook, *Design Guidelines for DoD Historic Buildings and Districts* (Guidelines) provides assistance to installation commanders and their staff to ensure their decisions support DoD's goal of stewardship with regards to cultural resources. It serves as a comprehensive guide for the appropriate treatment of historic districts and buildings on DoD installations within the continental United States.

The Guidelines have been prepared in connection with the Legacy Resource Management Program (Legacy) under the United States Department of Defense, Office of the Deputy for the Secretary of Defense. Legacy was initiated by Congress in 1990 as a way of balancing military training with the protection of natural and cultural resources on DoD lands. Through the program, various projects have been undertaken to enhance natural and cultural resources management. In keeping with the mission of the Legacy Program, this handbook provides DoD installations with the necessary tools to assist in the proper preservation and rehabilitation of their historic districts, buildings, sites, landscapes, structures and objects. Project 07-382, *Design Guidelines for DoD Historic Buildings and Districts* was funded through the U.S. Army Engineering and Support Center Huntsville with MIPR # W31RYO71801161.

In addition to DoD's objective of stewardship, DoD is required by federal laws to protect and preserve the nation's cultural heritage located on military lands. The National Historic Preservation Act of 1966, as amended in 2000, established the national policy on historic preservation. The act assigned federal agencies the responsibility of considering cultural resources during the planning phase of any federal or federally-funded project.

As a result, federal agencies must comply with the process known as Section 106 Review (as described in 36 CFR 800). Section 106 Review is an important aspect of cultural resource management because it requires DoD installations to assess the impact their undertaking or project will have on any historic district, site, building, structure or object.

A resource is considered a historic property if it is listed on or eligible for listing in the National Register of Historic Places (NRHP). The NRHP was developed as part of the National Historic Preservation Act of 1966 (NHPA) and is a list of the country's significant historic properties. Section 106 Review and the NRHP will be discussed further in Chapter 2, "Mission and Goals," of this handbook. Along with NHPA several additional laws and Executive Orders have been passed regarding cultural resources. Therefore, DoD installations must comply with the following laws and Executive Orders, including but not limited to:

- Antiquities Act of 1906
- Archeology and Historic Preservation Act of 1974
- National Environmental Policy Act (NEPA) of 1969
- American Indian Religious Freedom Act (AIRFA) of 1978
- Archaeological Resources Protection Act (ARPA) of 1979
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990
- Executive Order No. 11593 - Protection and Enhancement of the Cultural Environment of 1971
- Executive Order No. 13287 - Preserve America of 2003

For the purposes of this handbook, only NHPA and NEPA are relevant. However, for the complete list of laws and the full text versions of the Laws, please consult the Advisory Council for Historic Preservation (ACHP) website: http://www.achp.gov/ and the National Park Service (NPS) website: http://www.nps.gov/. For Executive Orders see the National Archives website: http://www.archives.gov/.

The Guidelines were developed with NHPA and NEPA in mind to help installations through the Section 106 Review process with regards to historic districts and buildings. The idea for the this handbook originated from design guidelines created by the Fort Bragg Cultural Resources Management Program in North Carolina in 2006.

Jump Towers are historic structures that contribute to one of the historic districts at Fort Benning, Georgia.

Fort Bragg created the design guidelines to facilitate the Section 106 Review process as the installation experienced an increase in rehabilitation and new construction projects that had the potential to impact the historic materials, features and character of the Old Post Historic District, the main historic district consisting of approximately 297 buildings. The guidelines were implemented and have proven to be a valuable resource during the planning stages of projects for the planners, project managers, contractors, building users, post architects as well as the cultural resources staff. Due to the success of the implementation of design guidelines at Fort Bragg, the idea of creating a similar handbook for use on all DoD installations emerged.

Development of the Guidelines began in 2007. The first stage of the project consisted of gathering information pertaining to the historic districts and buildings on DoD installations in the continental United States. Information included such items as architectural influences of the buildings, types of buildings and districts, types of projects commonly affecting these buildings and districts, and future development concerns. The information was collected by means of a questionnaire circulated to installations and site visits conducted at a sampling of installations in the different regions of the country.

Methodology

The authors created and tailored the design guidelines to DoD historic properties based on the information collected and the *Secretary of the Interior's Standards for the Rehabilitation of Historic Buildings* (these standards will be discussed in further detail in Chapter 5, "Design Standards"). Due to the diversity of the resources, the guidelines allow for flexibility in application to resources on any DoD installation. Overall, the handbook provides a framework for installations to facilitate the Section 106 review process and avoid negative impacts to historic districts and buildings.

The handbook is divided into three sections, with the first section, "Overview," containing four chapters that provide important information pertaining to the management of cultural resources. The first chapter is an overview of DoD and the individual military services cultural resources programs. In addition, the chapter defines the users of historic districts and buildings and their role in the preservation of these resources. The second chapter discusses the legal requirements and installations' goals and missions associated with cultural resources. The next chapter provides a synopsis of the history of the United States military and the evolution of their installations to provide a context for DoD's historic districts and buildings. The final chapter of this section describes the various architectural influences of DoD's historic districts and buildings to assist users in identifying the character-defining features of buildings.

The second section, "Design Standards and Guidelines," contains the appropriate standards for the treatment of historic properties and the design guidelines. The first chapter discusses the four different treatments for historic properties and their associated standards as developed by the Secretary of the Interior.

The remaining chapters contain the design guidelines that pertain to six core areas: Site and Setting; Changes to Building Exterior; Changes to Building Interior; Additions and New Construction; Additional Guidelines; and Demolition and Relocation. Within these chapters there are specific guidelines related to the various elements of an area. For instance, Chapter 7, "Changes to Building Exterior" has subchapters dedicated to each building element such as roofs, walls, and windows and doors. These guidelines are intended to provide general guidance for the management of historic properties and they are not meant to handle specific cases or address exceptions or rare examples. For the case-by-case application of the Secretary of the Interior's Standards, especially projects involving a major rehabilitation, adaptive reuse and/or new construction, military personnel should seek assistance from their State Historic Preservation Office (SHPO), and follow the proper protocol of their military service and installation.

The final section, "Additional Information," contains the appendices. The appendices include such information as: works consulted, list of acronyms, definitions of terms, glossary of architectural terms, sources for technical assistance, and sources for additional information by subject area.

The Guidelines will provide a valuable planning tool for installation personnel to assist in the daily management of their historic buildings, structures, and districts. Additionally, the handbook will provide them with the ability to quickly access specific information in one illustrated, simply organized document.

The main entrance of this installation is an example of a historic landscape. Randolph Air Force Base, Texas

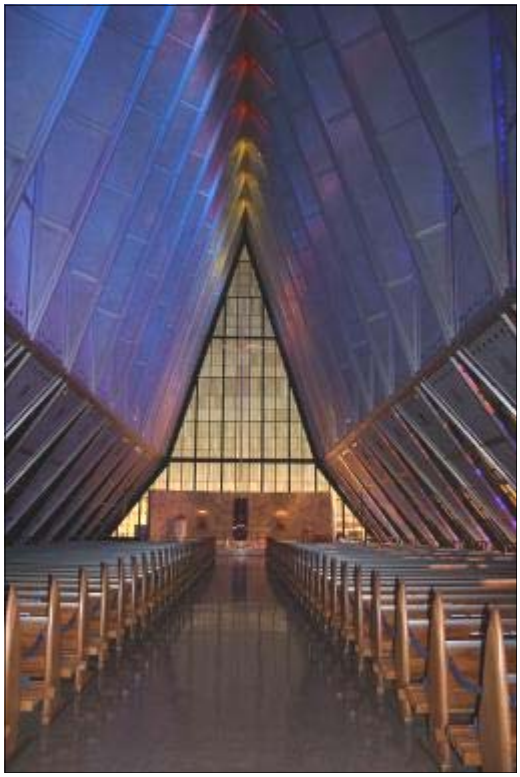
Historic buildings contribute greatly to the historic character of installations. Original Gatehouse, Naval Station Great Lakes, Illinois

SECTION I. OVERVIEW

Chapter

1. CULTURAL RESOURCES MANAGEMENT
2. MISSION AND GOALS
3. HISTORICAL BACKGROUND AND CONTEXT
4. ARCHITECTURAL INFLUENCES

Chapel
Fort Riley, Kansas
Photo courtesy of Fort Riley Public Works,
Conservation and Restoration Branch



Interior, Cadet Chapel
United States Air Force Academy, Colorado

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1.1 Department of Defense Cultural Resources Management

The Pentagon
Photo courtesy of the Department of Defense

The military has a long-standing history of managing cultural resources and DoD continues that practice today. In the late 1800s, Congress appointed the military to protect our country's first national park, Yellowstone. A few years later in 1890, Congress expanded that mission to include the management of several Civil War battlefields to ensure their preservation.

Today, DoD manages approximately 30 million acres of land in the United States and its territories. A large portion of our nation's heritage is portrayed on this land, as archaeological sites, underwater ship and aircraft wrecks, and historic buildings, structures, objects, sites and districts are all part of DoD's real property inventory. These cultural resources are the tangible connections to our country's past and through their preservation we are connected to the important people, events and ideals that have influenced and shaped the development of this country.

DoD's principle mission is military readiness and stewardship of cultural resources is an essential part of that mission. Therefore, federal laws, regulations, and programs have been established to facilitate the management of DoD's cultural resources. The DoD cultural resources management program originates at the Office of the Deputy Under Secretary of Defense (Installations and Environment). This office, under the direction of the Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), oversees the conservation of DoD's cultural resources as well as the military's compliance with environmental laws and regulations. The office developed DoD Instruction 4715.3 "Environmental Conservation Program" to provide guidance on all DoD conservation programs including cultural resources management.

Additionally, the office develops guidance and programs in cooperation with the ACHP and the National Conference of State Historic Preservation Officers (NCSHPO) to assist the individual military services with the management of their cultural resources. Although the Office of the Deputy Under Secretary of Defense for Installations and Environment oversees cultural resources management on military lands, DoD relies on the individual military services and their installations to strengthen DoD's ability to preserve our nation's heritage.

1.2 Individual Military Services Cultural Resources Management

1.2.1 Department of the Army

The Department of the Army's cultural resources program is managed under the direction of the Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) (DASA-ESHO). This office is charged with providing oversight and coordinating the Army's responsibilities under NHPA. In 1994, the Secretary of the Army created the Director of Environmental Programs (DEP) to establish Army cultural resources policy and guidance. Along with the DEP, the U.S. Army Environmental Command (USAEC) was established to provide further assistance to installations on cultural resources management in addition to other Army environmental programs.

The principle policy governing the management of cultural resources on Army installations is established in Chapter 6 "Cultural Resources" of Army Regulation 200-1 "Environmental Protection and Enhancement" (AR 200-1), issued in 2007. AR 200-1 provides the broad preservation and operational policies for the Army by addressing important aspects of cultural resources management. The document addresses such topics as compliance with federal laws and agreements between agencies and the development of Integrated Cultural Resources Management Plans (ICRMP).

By applying the guidance in AR 200-1, along with the assistance of the DEP and USAEC, the Department of the Army commanders and installations have the ability to manage cultural resources located on Army installations.

1.2.2 Department of the Navy and Marine Corps

The overall management or guidance for cultural resources for the Department of the Navy is provided under the direction of the office of the Assistant Secretary of the Navy (Installations and Environment) through the office of the Deputy Assistant of the Secretary of the Navy (Environment) (DASN(E)). Another crucial organization in cultural resources management is the Naval Facilities Engineering Command (NAVFAC).

NAVFAC provides technical support to installations, which includes installation planning, facility design and construction, and environmental compliance. Similar to the other military services, the Department of the Navy has issued their own regulations and guidance through the Secretary of the Navy Instruction (SECNAVINST) 4000.35 "Department of the Navy Cultural Resources Program." The guidance was issued in 1992 and recently updated in 2001. It establishes the policy and responsibilities within the Department of the Navy for the management of cultural resources. The document outlines the responsibilities of key players in the process including the Assistant Secretary of the Navy, Department of the Navy Federal Preservation Officer, Chief of Naval Operations and the Commandant of the Marine Corps, cultural resources managers, as well as other organizations within the Department of the Navy. In addition, the document sets forth the framework of cultural resources policy on such items as compliance with federal laws, consultation with various groups concerning cultural resources, and the inventory and evaluation of historic properties.

Along with SECNAVINST 4000.35, the Department of the Navy issued further instruction in Chapter 23 "Historic and Archaeological Resources Protection" of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1B. The guidance was issued in 1994 and was updated in 2002. The chapter supplements SECNAVINST 4000.35 guidance regarding the management and use of historic properties to include National Historic Landmarks, and the responsibilities of commanders and installations in terms of cultural resources.

The Marine Corps is under the direction of the Department of the Navy, therefore Marine commanders and installations must comply with SECNAVINST 4000.35 for cultural resources management. However, Headquarters, Marine Corps (Installations and Logistics) oversees cultural resources management on Marine Corps installations. The department provides guidance to commanders of installations on environmental compliance and protection which includes cultural resources. Along with SECNAVINST 4000.35, the Marine Corps installations must follow MCO P5090.2A "Environmental Compliance and Protection Manual," which provides further guidance for cultural resources management. As a result of guidance provided by the Department of the Navy and Headquarters Marine Corps, commanders and installations have the ability to manage their cultural resources.

1.2.3 Department of the Air Force

The Department of the Air Force's cultural resources management program is under the direction of the Secretary of the Air Force (Installations, Environment and Logistics) (SAF/IE) through the Deputy Assistant Secretary of the Air Force (Energy, Environment, Safety and Occupational Health). This office oversees the Air Force's cultural resources policy and guidance. The office works with DoD and other military services to develop overall cultural resources policy and program initiatives.

To further assist Air Force installations, the Air Force Center for Engineering and the Environment (AFCEE), a field operating agency of the Air Force Civil Engineer, provides expertise to support installations in the preservation of Air Force cultural resources.

Air Force Policy Directive 32-70 "Environmental Quality" (AFPD 32-70), issued in 1993, sets forth the overall policy regarding the protection and management of cultural resources on Air Force installations. In order to ensure compliance with the Air Force directive by the major commands and installations, Air Force Instruction 32-7065 "Cultural Resources Management Program" (AFI 32-7065) was issued in 1994. AFI 32-7065, updated in 2004, provides guidelines for all aspects of cultural resources management. AFI 32-7065 directs the inventory and evaluation of properties eligible to the NRHP, describes protective measures to avoid adversely affecting cultural resources, provides standards for the maintenance and rehabilitation of historic properties, and outlines the responsibilities of key players in the cultural resources management process.

Through the application of AFPD 32-70 and AFI 32-7065, in conjunction with the guidance provided by the office of the Deputy Assistant Secretary of the Air Force (Energy, Environment, Safety and Occupational Health), major commands and installations have the ability to manage cultural resources on Air Force installations.

The military services manage several types of cultural resources including historic buildings and landscapes.
Top: Bachelor Officers Quarters, F.E. Warren Air Force Base, Wyoming
Bottom: Butler Stadium, Marine Corps Base Quantico, Virginia

1.3 Installation-level Cultural Resources Management

Installation-level cultural resources programs are essential to the management of cultural resources. These programs have the daily responsibility of ensuring their installations are in compliance with federal and state (where applicable) cultural resources laws and regulations. The establishment and responsibilities of installation-level cultural resources programs are outlined in the regulations and guidance documents for each military service. The documents require installations to develop a cultural resources program through the appointment of a cultural resources manager. In addition, the documents list certain responsibilities associated with the position of cultural resources manager that will facilitate the management of cultural resources and compliance with the federal laws and regulations. These responsibilities include but are not limited to the following:

- Developing and implementing an ICRMP;
- Inventorying and evaluating cultural resources; and
- Reviewing all installation projects for compliance with guidance and federal legislation involving cultural resources.

(Please note, this list provides the similar responsibilities provided by the Army, Navy, Marine Corps, and Air Force. For specific duties please consult the individual military service's guidance.)

The daily management of cultural resources can be a challenging process, as installations are dynamic environments in which development occurs constantly through new construction and the rehabilitation or renovation of existing buildings. DoD and the individual military services realize the challenges faced by commanders and installations. In order to assist them, DoD and the military services, in cooperation with the ACHP, have developed Program Comments (PC) and Programmatic Agreements (PA) that take a comprehensive approach to the evaluation and treatment of various resources located on installations. For instance, recent PCs address the evaluation and treatment of their resources connected with Cold War Era Unaccompanied Personnel Housing and Ammunition Storage Facilities. Through PAs and PCs, DoD and the military services have lessened the burden of installations to conduct their own evaluations of these resources as well as to develop proper treatment plans.

To further facilitate the management of DoD cultural resources, the Guidelines handbook was developed to assist installations by providing additional guidance for the preservation and protection of historic buildings and districts. Through the development of this handbook and the combined efforts of DoD, individual military services and installations, cultural resources will be preserved for the enjoyment of future generations.

1.4 Managers, Users and Tenants of Historic Districts and Buildings

Since historic buildings and districts are an integral part of a military installation's built environment and are utilized daily as family quarters, administrative offices, military facilities, there is a probability of an inadvertent impact to them. Thus, in addition to cultural resources managers other individuals and organizations involved in the management and use of historic buildings and districts on installations should be aware of how their actions could adversely affect the historic character of these cultural resources.

On military installations there are several managers, users and tenants of historic buildings including but not limited to: regional and major command cultural resources managers, and at the installation level: Commanders, Public Works Directorates, planners, architects and engineers, environmental management departments, cultural resources managers, and residential and administrative tenants. All of these individuals and organizations should assume responsibility in the preservation of the buildings they live, work and/or manage to ensure their installations are in compliance with federal laws and regulations and to continue the enhancement of the installation's quality of life.

To ensure compliance, individuals and organizations should coordinate any plans for alterations to a historic building, landscape, site, structure, or object or new construction of any form in a historic district with the regional or major command cultural resources manager or the installation cultural resources manager depending on the protocol of your installation. The design guidelines, set forth in Section II, "Design Standards and Guidelines," of this handbook, will assist individuals and organizations in understanding the appropriate treatment of historic buildings and districts to facilitate the planning and development processes.

Historic photo from the 1880s depicting users of buildings on installations.
Fort Leavenworth, Kansas
Photo courtesy of Fort Leavenworth Directorate of Logistics/Public Works Files

2.1 Mission and Goals

The primary mission of DoD is to "provide the military forces needed to deter war and to protect the security of the United States."[1] To ensure DoD's mission, individual military services are tasked with training and equipping their personnel to perform military duties. To facilitate the military services in meeting their mission, installations must provide "services necessary to support our military forces in a cost effective, safe, sustainable and environmentally sound manner."[2] The management of cultural resources supports the mission of installations by ensuring that they are compliant with federal regulations and are operating in an environmentally sound manner. Furthermore, historic preservation supports military forces by enhancing the quality of the environment in which military forces train and live. As good stewards of cultural resources, military installations can strive to meet their mission and in turn protect America's tangible heritage and enhance the quality of the environment on military installations.

2.2 Legal Requirements and Compliance

Since military installations are managed by DoD, a federal agency, they are responsible for compliance with all federal statues and regulations including two laws related to cultural resources: the National Historic Preservation Act of 1966 (NHPA) and the National Environmental Policy Act of 1969 (NEPA). The NHPA has two sections that directly relate to an installation's stewardship responsibility. First, Section 106 states that all federal agencies must take into account the effects that their undertakings (federally-funded projects or activities) will have on any building, site, structure, object or district listed in or eligible for listing in the NRHP as well as the impact on historic views and viewsheds. As part of this section, installations must evaluate the impact of their actions on cultural resources through a process known as Section 106 Review. In terms of historic districts and buildings, the Section 106 Review process examines if an undertaking will harm or cause an adverse effect to a district or building's integrity or character. For instance, repairing a historic door in-kind does not constitute an adverse effect to a building. However, incompatible replacement of the historic door is an adverse effect as the building's historic character will be altered as a result of the undertaking.

[1] *DoD 101, An Introductory Overview of the Department of Defense,* Department of Defense, on-line, < http://www.defenselink.mil/pubs/dod101/dod101.html#organized> Accessed 20 November 2007.
[2] *Installations: The Home of Combat Power,* Office of the Deputy under the Secretary of Defense (Installations and Environment), on-line, < http://www.acq.osd.mil/ie/> Accessed 20 November 2007.

Secondly, Section 110 of the NHPA ensures federal agencies will integrate historic preservation into their programs. Integration of historic preservation occurs in two ways: 1) by the establishment of a program to identify and evaluate historic properties; and 2) protection of historic properties including the avoidance of unnecessary damage to properties. Under Section 110, installations should conduct periodic surveys of their cultural resources to identify historic properties that are eligible for listing in the NRHP.

The NRHP is a list, maintained by the National Park Service under the Department of the Interior, of properties (historic districts, sites, buildings, structures and objects) that have historic, architectural, archaeological, engineering or cultural significance at the national, state, and local level. Properties are eligible for listing in the NRHP if they meet at least one of the four Criteria for significance, and retain integrity. The four Criteria for significance are as follows:

- *Criteria A* (events) — Associated with events that have made a significant contribution to the broad patterns of our history; OR
- *Criteria B* (people) — Associated with the lives of persons significant in our past; OR
- *Criteria C* (architecture) — Embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or the possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; OR
- *Criteria D* (archaeology) — Have yielded, or may be likely to yield, information important in prehistory or history.[3]

In addition, the property must possess integrity of location, design, setting, materials, workmanship, feeling and association. A building or district listed on or eligible for listing in the NRHP is deemed worthy of preservation and becomes part of a federal agency's preservation program. The NHPA set forth the national policy governing the proper preservation of historic properties by the U.S. government. As part of a federal agency, military installations must comply with the above sections of the NHPA as well as all other sections of the act.

Another major federal law involving cultural resources is NEPA. NEPA is an overarching environmental policy that includes a cultural resources component. All federal agencies including DoD, are responsible for compliance with NEPA. Overall NEPA declares a national environmental policy in which the federal government is required to "use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony."[4]

[3] *How to Complete the National Register Registration Form*, National Register Bulletin, Department of the Interior, National Park Service, Cultural Resources, 1997.

[4] *Frequently Asked Questions, National Environmental Policy Act,* U.S. Environmental Protection Agency, on-line, <http://www.epa.gov/compliance/resoures/faqs/nepa/index.html> Accessed 18 November 2007.

As part of this requirement, federal agencies must go through the NEPA process of preparing documentation that assesses the environmental impact of and alternatives to major federal actions significantly affecting the environment. Cultural resources are a vital part of the environment and consequently are part of the NEPA process. When an installation is preparing NEPA documentation, they must take into consideration the impact the federal action will have on cultural resources.

NHPA and NEPA are only two of several laws and regulations involving history, prehistory and archaeology that require compliance from military installations. For the complete text of NHPA and NEPA and for additional information related to cultural resources law, please consult the ACHP website http://www.achp.gov/. In addition to federal laws and regulations, military installations are responsible with complying with DoD and the individual military services' regulations for cultural resources. For information regarding DoD and individual military services regulations please consult the previous chapter, "Cultural Resources Management."

2.3 Sustainability and LEED Standards

Military installations are currently finding innovative ways to incorporate sustainability and energy efficiency into new construction and adaptive reuse projects. According to the 1987 report by the World Commission on Environment and Development (a.k.a. Brundtland Commission) to the United Nations, sustainability involves "meeting the needs of the present without compromising the ability of future generations to meet their own needs."[5] Sustainability strives to create harmony between the environment and development through the implementation of specific design standards as related to five key areas: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

The United States Green Building Council (USGBC) has developed a framework for implementation of such standards through the Leadership in Energy and Environmental Design (LEED) building rating system. The LEED rating system applies to existing buildings (LEED-EB), new construction and major renovations (LEED-NC), neighborhood development and commercial interiors. Through the rating system, a building must meet certain standards to reach a specific level of sustainability or green building rating.

As a large property owner, DoD has implemented sustainability into the building and construction programs at its installations. To promote DoD in its goal of sustainability, historic preservation plays a vital role. Rehabilitation or adaptive reuse of historic buildings with the retention of historic materials is "the ultimate recycling." Better yet, "the greenest building is one already built," to quote common phrases in the preservation field.

[5] "Report of the World Commission on Environment and Development," United Nations General Assembly, 96th plenary meeting, 11 December 1987, on-line, < http://www.un.org/documents/ga/res/42/ares42-187.htm> Accessed 25 November 2007.

The preservation of historic buildings saves millions of tons of wasteful building debris and materials from entering our nation's landfills. In addition, it saves energy as various types and large amounts of energy are needed to demolish an existing building and construct a new one. All things considered, historic preservation assists installations in fulfilling their responsibilities for sustainability and the implementation of design standards similar to the LEED building rating system.

For more information regarding the implementation of LEED standards for historic buildings, please consult the *DoD Sustainability Application Guide for Historic Properties* developed by ERDC-CERL and the Hardlines Design Company in May 2007, available on the Defense and Environmental Network & Information eXchange (DENIX). Furthermore, the Sustainable Preservation Coalition, a partnership between several organizations including the National Trust for Historic Preservation, Association of Preservation Technology, American Institute of Architects and the National Park Service, is working closely with the USGBC to incorporate historic preservation, specifically the adaptive reuse and the rehabilitation of historic buildings, into the LEED rating system. Please consult the USGBC website for updated and additional information regarding historic preservation and LEED, http://www.usgbc.org/.

2.4 Quality of the Environment

One of the inherent benefits of historic preservation is its ability to positively impact an area's aesthetic value and quality of life. Historic architecture and landscaping provide a visually pleasing backdrop to any installation, improving its aesthetic quality. Additionally, the historic buildings and landscapes act as a bridge, providing a tangible link to the installation's past, present and future. This link creates a sense of identity and place which instills a sense of pride in the individual who lives and works on the installation. Through the proper management of cultural resources, installations can achieve the goal of improving the quality of life and the environment for their military personnel who live and work on the installation.

Historic family housing streetscape enhances the quality of the environment at Fort Bragg, North Carolina. Photo courtesy of Fort Bragg CRMP

Historic golf clubhouse and course enhance the quality of the environment at the Naval Base Norfolk, Virginia. Photo courtesy of the Department of the Navy

3.1 Evolution of the United States Military[6]

The United States military has a diverse collection of cultural resources including coastal fortifications of the 1830s and missile launch shelters of the 1950s.
Left: Fort Monroe, Virginia; Right: McGuire Air Force Base, New Jersey

In order to fully comprehend the cultural resources that comprise our nation's heritage, one must understand the context in which these resources were developed. The present-day United States military is an institution with a long and evolving history. This history has involved several conflicts and wars that have shaped the development of military installations as the armed forces sought to train its men and women and protect the country. The following is a brief synopsis of United States military history highlighting significant time periods and events to provide a historical framework for DoD's historic districts and buildings.

The origin of the United States military dates to the country's pursuit for independence from England in the late 18th century. At the start of the America Revolutionary War in 1775 with England, the Second Continental Congress authorized the creation of a Continental Army and a Continental Navy consisting of two vessels and two battalions of Marines. The establishment of the Continental Army, Navy and Marines and their fight in the American Revolutionary War marked the beginning of the rise of the United States military.

Throughout the early part of United States history, the functions of the military were divided into two departments—the War Department, also known as the Army (1789) and the Department of the Navy (1798) who also supervised the Marine Corps.[7] These two departments provided the framework for the country's military. As the country went through periods of peace and turmoil, these departments acted accordingly by reducing the size of the military at times of peace and expansion at times of turmoil.

[6] Portions of this history were adapted from *Built on Strong Foundations: Constructing Our Nation's Military Heritage* prepared by R. Christopher Goodwin & Associates, Inc. in 2004.
[7] The current organization of the military was established in 1947 as part of the National Security Act which created the Department of Defense to oversee the three individual components 1)Army, 2) Navy, and 3) Air Force.

The first reduction of the United States military occurred after the close of the American Revolutionary War in 1783. The Army was reduced to a peace time Army of 700 men and the Department of the Navy and the Marine Corps were altogether disbanded. This would change as the United States embarked on creating a new nation during the early 1800s.

To protect the nation's newly found interests in the frontier lands and ward off British threats at the coast, the United States strengthened its military force in the 1790s. The threat of a British invasion prompted the construction of coastal fortifications and the development of a Navy with six frigates. The United States declared war on England in June of 1812.

After the War of 1812 ended in 1814, the United States continued to protect its interests and settlers in the Northwest Territory (present-day states of Ohio, Indiana, Illinois, Michigan and Wisconsin) from British and American Indian threats by maintaining a military presence in the area. This mission of protection continued as the country acquired new land in the west through the War with Mexico in 1846. During the early years of the United States, the military played a vital role in ensuring the creation of a new nation by protecting the country's new holdings and protecting its citizens from internal and overseas threats.

The next era of United States military history was a period of internal conflict. The overseas threats against the United States diminished, but internal conflicts intensified as the Civil War began and the "Indian Wars" developed on the frontier lands. The Civil War against the Confederacy was waged in 1861 with the Confederate attack on Fort Sumter in South Carolina and continued until the Confederacy surrendered in 1865.

Although the conflict of the Civil War was over, the Indian Wars in the west pursued. In order to settle the unrest in the west, the Army was ordered to escort American Indian tribes to reservations, protect the white settlers and ensure the settlers did not encroach on the Indian reservations. After many clashes, the last conflict of the "Indian Wars" occurred in 1890 at the Battle of Wounded Knee in South Dakota. As these internal conflicts of the country came to an end, the United States focused on reconstructing its nation, which included the modernization of its military.

The last few decades of the 19th century saw the development of a modern military. At this time, the Army sought to improve living conditions on its installations by constructing permanent buildings and the Navy implemented new technology into its ship developments. The theme of development continued as the military created specialized installations to support its modernization. In 1874 the Army constructed Sandy Hook Proving Ground in New Jersey for ordnance testing and in the 1880s the Navy established a proving ground at Annapolis, Maryland. In addition, the military expanded its force through the testing of aviation and the purchase of the first modern submarine during the early 1900s.

To further enhance its development, the military placed emphasis on military training and education of its officers and enlisted men. This led to the creation of several specialized schools including: the Artillery School at Fort Monroe, Virginia; the School of Application for Infantry and Cavalry at Fort Leavenworth, Kansas; and the Cavalry and Light Artillery School at Fort Riley, Kansas.

The need for a modernized highly-trained and well-equipped military emerged from the United States increased involvement in international affairs during the late 19th century and early 20th century. The United States military participated in conflicts in Cuba, Puerto Rico and the Philippines as part of the Spanish-American War in 1898, and the Army Corps of Engineers constructed the Panama Canal from 1907 to 1914. The modernization and development of the military into a highly-trained and well-equipped force would prove useful in the upcoming years during World War I.

Congress declared war on Germany after learning about Germany's attempt to form an alliance with Mexico in March of 1917. Congress' declaration of war on Germany made the United States involvement in World War I official initiating a massive mobilization effort by the United States military. All resources were directed toward preparing the armed forces to fight the war including the construction of temporary camps to house and train thousands of recruits, the creation of specialized schools, and the emergence of aviation facilities.

Although aviation had been part of the military through testing, it had not become fully integrated until World War I. In 1917 the Aviation Act was passed, authorizing the construction of more flying fields, aircraft, supplies and personnel as aviation was recognized for its military advantages in terms of aerial combat, bombing missions and enemy reconnaissance.

The signing of the Treaty of Versailles in 1919 officially ended World War I, enabling the U.S. forces to return home. Upon the return of the American forces, an era of peace began for the country. Although the country faced no immediate threats, the military did not reduce its force to traditional peacetime numbers. The military remained strong at a force of approximately 220,000 men and women, however naval forces were reduced due to international disarmament agreements. Since during this time the military did not have to focus on winning a war, they focused on producing a better trained and more efficient force. This era saw the implementation of new administrative reforms, developments of new technologies related to aviation, tanks and motor transportation, and an increased emphasis on education and training.

One of the most significant developments at this time was related to military aviation. The Army Air Corps was established in 1926 and a few years later in 1935 the General Headquarters Air Force was created based at Langley Field, Virginia. The General Headquarters Air Force was the first step towards a separate air force, as the headquarters commanded selected air units.[8]

The United States' enjoyment of peace would come to end again in 1941. Although much of Europe was at war in 1939, the United States remained neutral until the Japanese attacked Pearl Harbor on December 7, 1941. Just as in World War I, the United States entered a state of mobilization to once again prepare its armed forces for war. Temporary cantonments were constructed to house and train recruits. In addition to training camps, the military constructed support facilities such as hospitals and industrial facilities for the production of ammunition, weapons and aircrafts and ships. As the home front transformed into a hub of production of trained men and women and supplies, the military forces in Europe and the Pacific led a strong warfare campaign to defeat the threat of Germany, Russia, Japan and their allies. In 1945, World War II ended as Germany surrendered in May and Japan surrendered in August after the detonation of the atomic bombs on Hiroshima and Nagasaki. Millions of men and women returned home back to civilian life; however, a time of peace would have to wait.

Soon after the end of World War II, a new war emerged as the Soviet Union sought to expand its territory. This war, known as the Cold War, would continue for the majority of the 20th century from 1946 to 1989. The United States took the lead in preventing the spread of communism through their involvement in two major conflicts: Korea Conflict (1950-1953) and Vietnam Conflict (1959-1975) along with minor conflicts in Lebanon, Beirut and Grenada. To create a more efficient military force during the Cold War, the armed forces were united under one organization, the Department of Defense. In 1947, the National Security Act established DoD and the following three separate departments:

1. The existing War Department became the Department of the Army and was charged with the mission of maintaining ground force readiness.
2. The existing Department of the Navy continued and the Marine Corps remained as a separate service under the Department of the Navy. This department had the primary task of defending the United States borders through control of the oceans.
3. The Department of the Air Force was created and charged with defending the United States borders by way of air supremacy.

During this era, the military also actively participated in research and development of nuclear weapons and space technology. In 1989, the collapse of the Berlin Wall in Germany signaled the end of the Cold War.

[8] *National Historic Context for Department of Defense Installation, 1790—1940,* Vol. I, prepared by R. Christopher Goodwin & Associates, Inc. (U.S. Army Corps of Engineers, Baltimore District: 1995), 81.

As the 20th century came to a close, the United States remained a leading military force. The United States military participated in international conflicts as they arose, such as in the Gulf War (1990-1991) to assist coalition forces in liberating Kuwait from Iraqi forces. Today the U.S. military continues to develop and strengthen its forces as the part of the Unites States engagement in the Global War on Terrorism against terrorist organizations.

In its history, the United States military has undergone several changes in response to the country's ever-changing domestic and foreign needs and obligations. These changes are reflected in the evolution of military installations from forts and coastal fortifications to self-contained military installations. As the military changed or participated in a war or conflict, their actions helped to shape the development of military installations throughout the country.

3.2 Evolution of Military Installations and Construction

Since the establishment of the United States, military installations have been an integral part of the country's built environment. Similar to historic towns and cities, installations are a record of their time and continue to evolve, portraying the planning and architectural concepts associated with the time in which they were established and modified. Discussion of the historic development and construction of United States military installations is grouped into eight eras beginning, with the creation of the nation and the military in 1775 and ending with the Cold War in 1989. Each era has a distinct architectural and landscape record and is described briefly on the following pages.[9]

3.2.1 Establishment of a Nation, 1775-1790

The first era begins with the country's fight towards independence in the American Revolutionary War (1775-1783). As the military engaged in war with England, it strengthened its forces through the construction of fortifications and naval vessels. Due to the urgency of the war, installations created at this time were limited to the Army and often were temporary in nature.

[9] Portions of this history were adapted from the *National Historic Context for Department of Defense Installations, 1790-1940, Volume 1,* Prepared by R. Christopher Goodwin & Associates, Inc. for U.S. Army Corps of Engineers, Baltimore District in 1995.

Army

As the newly formed military entered into war, the Chief Engineer for the Continental Army designed and supervised the construction of fortifications and other defense structures.[10] The first military installations consisted of forts, batteries, and temporary encampments built at strategic locations along rivers, on high ground in the colonies and the western frontier to offer protection to area residents from the British.[11]

The majority of these installations were temporary and built by the soldiers with local materials and resources. Although the installations provided the Army with the basic necessities, they were rustic in nature and many times involved cramped quarters and makeshift shelters of branches, brush and leaves.[12] For instance, during the winter months at Valley Forge, Pennsylvania, General George Washington and his men lived in a temporary encampment of single room log huts with a wood fireplace, each housing twelve soldiers.[13]

A reconstructed cabin at Valley Forge, Pennsylvania portraying the typical construction of early military buildings.
Photo courtesy of ERDC-CERL

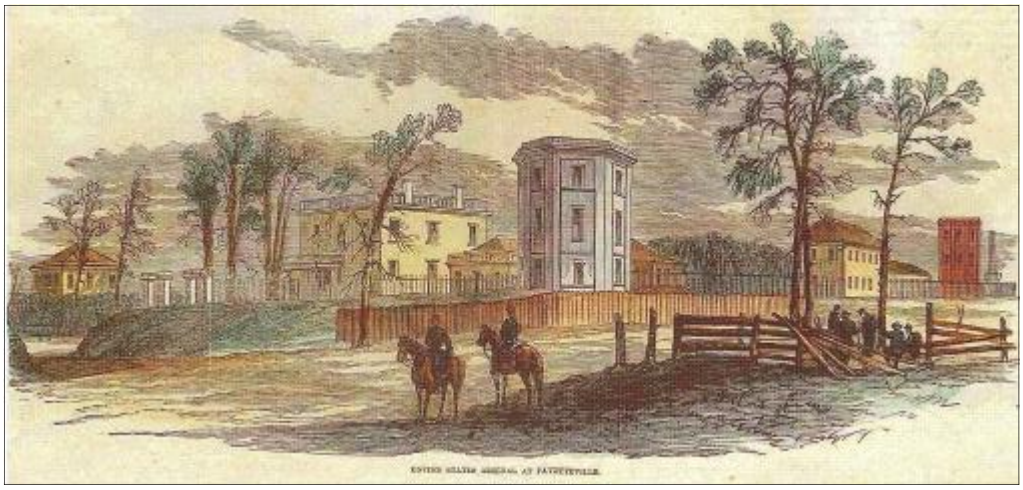
[10] *Built on Strong Foundations: Constructing Our Nation's Military Heritage,* prepared by R. Christopher Goodwin & Associates, Inc., 2004, 3.
[11] Ibid., 5.
[12] Ibid.
[13] Ibid.

Navy

Unlike the Continental Army, the Continental Navy did not construct installations or shipyards but rather contracted with private shipyards located in Norfolk, Virginia, and Portsmouth, New Hampshire.[14] The sailors were quartered aboard the ships; therefore at this time, there was no need to construct Navy installations.[15]

3.2.2 Early Republic, 1790 – 1860

The Early Republic era focused primarily on defense and featured the construction of several coastal forts, frontier installations and naval shipyards for the country's protection against foreign countries, pirates and American Indians. Although events during this time period required the presence of the military, Congress was reluctant to spend money on the military or enlarge the size of the military. The military installations of this time period reflect that attitude and were constructed at slow speeds with the majority of buildings being of temporary construction.



United States Arsenal at Fayetteville, North Carolina constructed in 1838.
Leslie's Weekly, 1865

Army

During this era, the Army established four types of installations: 1) coastal fortifications; 2) frontier posts; 3) arsenals and armories; 4) education and training installations. The construction responsibilities were divided amongst the Army Corps of Engineers (1779), who focused on coastal fortifications, and the Quartermaster Corps (1775), which developed the remaining types of installations.

[14] *Built on Strong Foundations,* 5.
[15] Ibid.

As part of their duties, the Army Corps of Engineers developed the "First System" of coastal fortifications in 1794 to defend the harbors. They systematically constructed earthwork fortifications with at least eight artillery pieces along the eastern seaboard. However, as threats from England arose, a "Second System" of fortifications was implemented in 1807. This system was similar to the first in which a majority of fortifications were earthworks, although some were constructed with earth walls held in by masonry. A more permanent construction method and design of coastal fortifications was not developed until after the War of 1812.

Battles during that war showed the importance of coastal fortifications and, in particular, the importance of well designed and constructed forts. This led to the development of a final system called the "Third System." The development of this system was supervised by a board of engineers established by the War Department in 1816. The board developed 38 masonry fortifications through a slow construction process lasting more than 40 years. These fortifications were further enhanced by the construction of casements or gun portals within the walls.

1861 drawing depicting the coastal fortification at Fort Monroe, Virginia.
Drawing courtesy of Fort Monroe's Casemate Museum, Department of the Army

As the Army Corps of Engineers helped to protect the country's coast line, the Quartermaster Corps worked to provide frontier posts to protect the frontier settlers and guard major trading routes against attack. In contrast with the newest system of coastal fortifications, the frontier posts, later called garrisons, continued to be primitive in design and construction during the initial decades of this era.

The first of the frontier posts were constructed east of the Mississippi River. After settlers began to establish homesteads west of the Mississippi in the early 1800s, more posts were established in the west. The eastern posts were positioned at strategic points to provide the maximum amount of protection, which usually meant that they were located away from cities and therefore away from supplies and labor. Due to this, the majority of posts constructed were small temporary garrisons that varied in design and style depending on the availability of local materials and the influence of the post commander.[16] However, the posts did conform in terms of a general layout. Small garrison posts usually contained quarters, storage and shop buildings enclosed by a wooden defensive wall, often called a palisade, with corner blockhouses.[17]

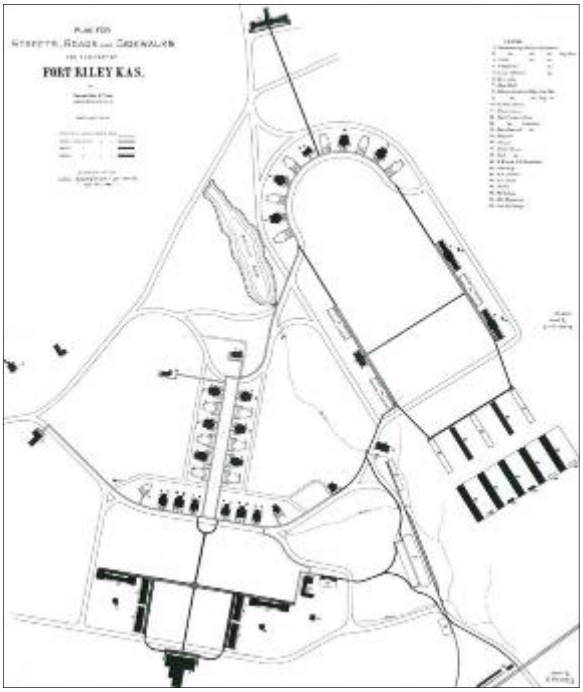
As the War of 1812 ended and the threat of British attack subsided, the defense walls and blockhouses were gradually demolished at the eastern frontier posts. Even though attacks from American Indians continued, the necessary level of protection decreased resulting in a transition from fortifications to garrisons where soldiers would be quartered and then dispatched to trouble spots.

The transition into a garrison resulted in the development of a more civilized post that included brick and frame quarters, workshops, storehouses, gristmills, sawmills and other facilities needed to support a community. Overall, eastern frontier posts were extremely self-sufficient; they relied heavily on the labor of their soldiers and local materials for their development and construction.

While the eastern frontier posts were establishing permanent garrisons, the western frontier forts were just beginning their existence. The military, in keeping with its responsibility for protecting the citizens of the United States, ventured west of the Mississippi River as the country expanded its borders to include the present-day states of Oregon, California and Texas. As settlers sought to pioneer the western frontier, trade routes were established such as the Oregon Trail, California Trail, and Santa Fe Trail. The military established forts in order to protect the traders and settlers traveling along these routes

[16] *Context Study of United States Quartermaster General Standardized Plans, 1866—1942,* prepared by U.S. Army Environmental Center, Environmental Compliance Division, (U.S. Army Corps of Engineers, Seattle District: 1997), 35.
[17] Ibid.

By the time the western frontier posts were established, the garrison concept was popular and the layout of posts had evolved into a concise plan. The majority of the western posts, such as Fort Riley, Kansas, were conceived as garrisons that utilized a post plan of a centrally located parade ground surrounded by barracks, Officers' housing and administrative buildings.[18] Other service areas were located apart from the parade ground and included a hospital, guardhouse, agricultural fields and shops.[19] Although the posts followed a standardized arrangement, the soldiers still had to construct their own quarters with local materials and resources, creating regional variations of architectural styles or influences.



Early drawing of Fort Riley, Kansas depicting the typical post plan of a parade ground surrounded by buildings.
Drawing courtesy of Fort Riley Public Works, Conservation and Restoration Branch

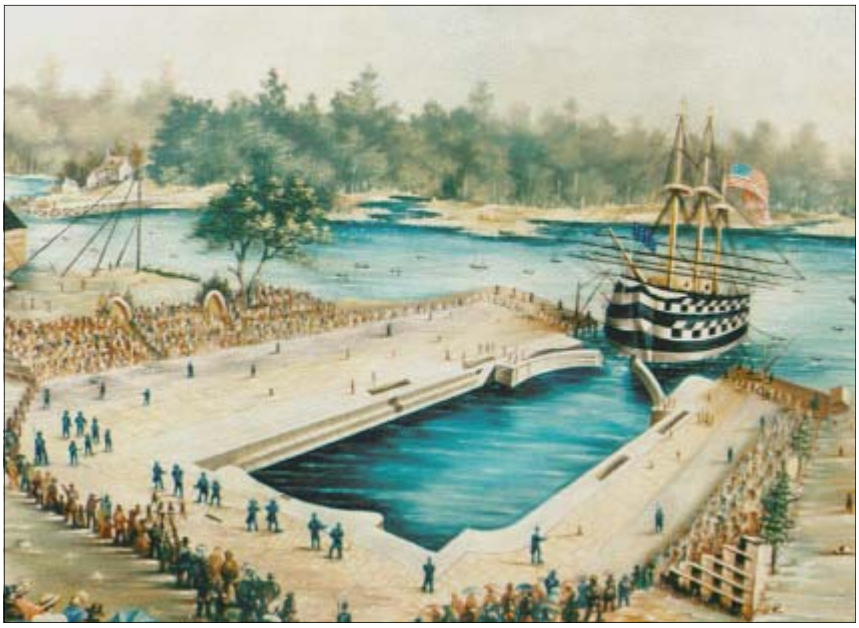
In addition to the defense installations, the Army developed specialized installations to support its mission including armories and arsenals, as well as schools and training installations. Armories and arsenals were established along the eastern coast such as Springfield Armory, Massachusetts and Schuylkill Arsenal, Pennsylvania. There were very few schools within the Army at this time, with the Military Academy at West Point, New York (1802) as the principal military educational institution. Several installations coupled their military duty with training, including Fort Monroe, Virginia which was the largest coastal fortification but also the Artillery School of Practice.

[18] *Context Study,* 36.
[19] Ibid.

Navy

The Navy was disbanded after the end of the American Revolutionary War, but was reorganized in the 1790s by Congress to protect American commerce ships against attack from pirates and to defend the country's coast from other threats. To assist the Navy in its construction, repair and re-supply of its fleet, numerous naval yards and stations were established along the coasts.

By 1802, the Navy had acquired six naval yards at Washington, D.C.; Charlestown (Boston), Massachusetts; New York (Brooklyn), New York; Philadelphia, Pennsylvania; and two of the private naval yards from the American Revolutionary War: Portsmouth, New Hampshire and Norfolk, Virginia.



1830s drawing of Dry Dock #1 at the Norfolk Naval Shipyard, Virginia.
Drawing courtesy of the Hampton Roads Naval Museum, Department of the Navy

Throughout the antebellum period, the Navy would continue to expand its yards in response to various threats, and expand to the south and west to Pensacola, Florida; Memphis, Tennessee; and lastly Mare Island, California.

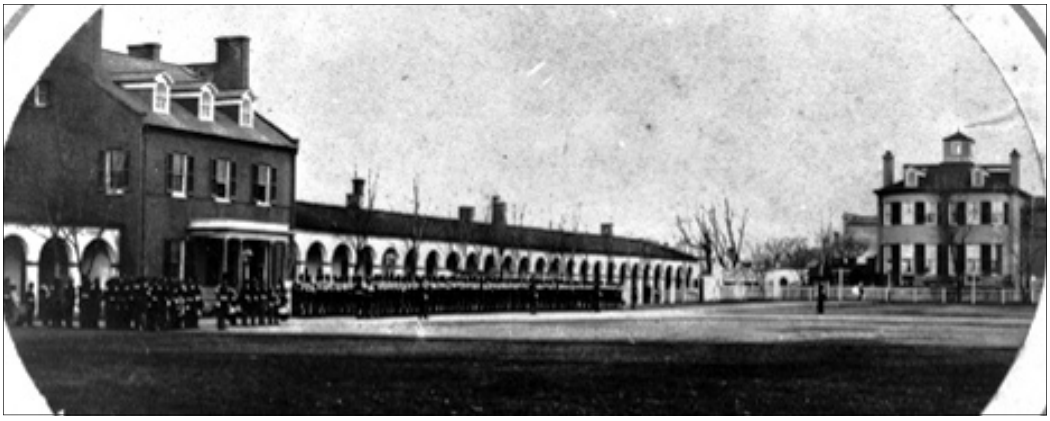
Some of the yards, due to their central locations and facilities, became more vital than other yards; these included those in Boston, New York and Norfolk. The other yards remained in use but became more specialized. For instance, Pensacola and Mare Island were used primarily for repairs to vessels in the Caribbean and Pacific. However; by the end of the era, the majority of the naval yards developed into multi-purpose facilities for the Navy, used as depots to re-supply ships, as keepers of inactive ships and to receive ships to quarter new recruits.

Since the naval yards functioned primarily to build and repair ships and vessels, the yards became industrial centers. Typical buildings contained in the yards included smithies, forges, rope walks, timber sheds, building slips, and other similar buildings and structures. Another important structure of the naval yards was the dry dock, which evolved at this time. The dry dock at first was built of granite below the water level, but to cut back on time and costs, engineers developed the floating dry dock consisting of a wooden frame.

In addition to the naval shipyards, the 1800s witnessed the construction of other important amenities for the Navy including hospitals near significant yards in the 1820s, the Naval Observatory in Washington, D.C. in 1830; and the Naval Academy at Annapolis, Maryland in 1845.

Marine Corps

The Marine Corps was officially established in 1798 with a multi-faceted mission of serving aboard ships to maintain order amongst the sailors, engaging enemy ships during close combat, and protecting the property at United States Navy yards. Since Marines had the duty of protecting the yards, each yard had a unit of Marines quartered in Marine barracks and officers housing. Sometimes, like at the Marine Corps Barracks in Washington, D.C., the Marine facilities were located adjacent to the yards.



Marine Corps Barracks in Washington D.C., ca. 1806
Photo courtesy of United States Marine Corps

3.2.3 Modernization, 1860 – 1890

The Civil War (1861-1865) would shape the military's evolution over the next few decades as the federal government accrued a large debt during the war, thereby causing military construction and spending to stagnate until the 1880s. After the debt was paid, the Army and the Navy began to transform into a modern conventional force with the construction of more permanent installations, new ships for the Navy, and increased educational and training systems for both military services.

Army

Prior to the 1860s, the Army assumed the principal role of policing the frontier and providing coastal defense to the country's major harbors. By the 1880s, the Army still maintained these missions but became a more organized force with permanent garrisons, a system for training of officers and soldiers, and new types of special purpose installations including proving grounds and quartermaster depots.

During the Civil War, the Army constructed fortifications and other facilities to assist in the war effort; however, only a few were retained after the war, such as Fort Whipple, Virginia (later Fort Myer) and McPherson Barracks, Georgia (later Fort McPherson). One important facility type developed and retained at this time was Army general hospitals built by the Quartermaster Corps. The Quartermaster Corps developed a standard design for these hospitals, termed the pavilion type. The pavilion type hospital consisted of physically separate wards or wings for different ailments connected by a series of corridors to prevent the spread of disease.

At the end of the Civil War, the Army reverted back to its original mission of defending the coast line and protecting settlers in the west. Unfortunately, the defense of the coast proved a challenge since during the Civil War it was discovered that the "Third System" of coastal fortifications was now obsolete given new naval technologies and advancements in weaponry. As stated previously, military spending was drastically hampered at this time, resulting in a lapse of time for the problem to be remedied. However, in 1885 a study of the United States coastal defense system was undertaken by a board of experts appointed by President Grover Cleveland, known as the Endicott Board. The board recommended the construction of batteries of heavy artillery along the coast line. These batteries did not resemble the earlier coastal fortifications but rather consisted of parapets designed to shelter heavy guns.

Life in the frontier also changed during this era, as most western states were established and American Indians were located on reservations by the 1890s. The Army continued its mission of protecting the settlers and acted as the law enforcement for the frontier. To ensure settlers protection, several small forts were dispersed in the frontier, usually created in response to specific problems.

The newly created forts utilized the same plan as the previous era (barracks and officer housing surrounding a parade field) and the buildings continued to be constructed by the soldiers with local materials.

In 1882, General William T. Sherman, Commanding General of the Army, presented a plan to Congress detailing a process for the Army to consolidate frontier fortifications. General Sherman believed that, since matters in the west had subsided, the Army should shift its attention to improving their fighting ability and discipline. Since the forts lacked the forces needed to protect the fort and handle a conflict outside the fort walls, a regional system would be more efficient. The Army transitioned to a regional installation system with permanent installations usually located near communication centers. Permanent regional installations at this time included Fort Leavenworth, Kansas; Fort Riley, Kansas; Fort Sill, Oklahoma; and Fort Huachuca, Arizona, all of which were originally frontier posts.

Historic photograph portraying the permanent construction of Fort Leavenworth, Kansas in January 1908.
Photo courtesy of Combined Arms Research Library, Special Collections

As the Army consolidated, it recognized the need to use standardized plans for post layouts and buildings to create more efficient installations. The Army, specifically the Quartermaster Corps, had already developed standardized plans for post layouts and buildings in 1866. Due to a lack of funding, the plans were not implemented in the west since the Army viewed the western forts as temporary.[20]

[20] *Context Study,* 34.

In the 1860s, the Quartermaster Corps initiated the development of standardized plans for specific buildings, in particular barracks and housing, to help facilitate the construction of installations as well as to enhance the quality of life for soldiers and their families.[21] The Quartermaster Corps enlisted the help of civilian architects to create standardized plans, resulting in the influence of popular trends in architecture and planning on Army installations.[22]

The first series of standardized plans included plans for a school house, mess hall, bakery, jail, chapel, barracks and family housing.[23] Post layouts consisted of the overall design of building locations, roads and parade ground, designation of land use areas such as quarters, administration, supply areas, and medical, and lastly vegetation including street trees and trees planted around the perimeter of the parade ground.[24] The plans were further developed by Quartermaster General Montgomery C. Meigs in 1872 after he inventoried post layouts and building plans.[25]

Meigs created new plans specifically for barracks and officer housing.[26] These plans, and the earlier plans of 1866, were not universally utilized in the Army until the 1880s when the Army was criticized for its inadequate quarters and poor living conditions.[27] Due to this, Army installations shifted from a diverse collection of layouts and architectural styles influenced by the tastes of the post commander to standardized arrangements of landscape features and buildings in particular architectural styles or influences.[28]

In addition to transforming western forts, the Army expanded its inventory by developing its existing specialized installations and creating new types. The Army continued a program of arsenal and armory construction and expanded its school system to incorporate new educational programs at various installations, such as military engineering at Willets Point, New York (now Fort Totten) and the School of Application, later reorganized as the Command and General Staff College, at Fort Leavenworth, Kansas. To further assist their mission, the Army established general depots from which the Quartermaster Department could supply installations with necessities; these included depots in New York, Philadelphia, Washington D.C., and Jeffersonville, Indiana.

[21] Ibid.
[22] Ibid.
[23] Ibid.
[24] Ibid.
[25] *Built on Strong Foundations*, 12-13.
[26] Ibid.
[27] *Context Study*, 34-35.
[28] Ibid.

Navy

Similar to the Army, the Navy also began to modernize during the 1880s as new advancements in ship building and weaponry caused the Navy to expand the mission of its shipyards and develop training programs. The modernization of the Navy was a slow process; the end of the Civil War saw the reduction of the Navy fleet, personnel, and funds for repairs to deteriorating shipyards. The situation changed in the 1880s, as the government emerged out of debt and money was available to repair shipyards and transform the fleet into a modern Navy.

The modernization of the Navy was initiated in 1883 with the construction of three new steel cruisers powered by steam, along with a number of larger battleships and colliers (smaller escort ships). The construction of the new vessels made the deteriorating condition of the shipyards obvious; the Navy did not have the facilities to develop the vessels and continued to rely on private contractors. The Navy slowly began the process of upgrading its shipyards to remedy this problem.

Prior to the 1880s, the shipyards were the industrial and supply centers, but now they needed additional buildings to support the modernized Navy fleet. The Navy shipyards developed into training facilities, coaling stations, naval magazines and research and development centers. The Navy established two installations strictly for the testing and development of weaponry – Annapolis Proving Ground, Maryland, and Torpedo Station, Rhode Island. The new weapons and vessels resulted in the need for a higher degree of training for its officers and seamen leading to the establishment of the Torpedo School, Rhode Island; the Naval War College, Newport, Rhode Island; and the Naval Training Station, Newport, Rhode Island.

Quarters A at Washington Naval Yard, Washington D.C. built in the 1790s but updated with Victorian-era ornament in the 1880s.
Navy Photo Library

Marine Corps

The Marine Corps continued their mission of protecting shipyards and maintaining order on Navy vessels and their facilities changed very little at this time.

Marines like these at the Marine Corps Barracks in Washington D.C. continued to protect Navy shipyards. 1896.
Photo courtesy of United States Marine Corps

3.2.4 Professional Military Force, 1890 – 1917

The modernization of the military into a highly trained and well-equipped force continued between 1890 and 1917. The United States military forces would be tested and their missions altered as the country became involved in international affairs including the Spanish American War of 1898, the Mexican Revolution of 1911 and the construction of the Panama Canal by the Corps of Engineers from 1907 to 1914. To support their modern force and new missions, the Army and the Navy continued to enhance their educational systems and the efficiency and living conditions of their installations.

Army

The Army continued with its reorganization from the previous decade with the consolidation of its frontier posts into larger regional installations. By 1891, they had closed 28 frontier posts, about one fourth of its installations. The consolidation of posts enabled the Army to establish policies and allocate funds for the permanent construction of quarters with adequate water, sewage, lighting and other utilities on the 52 posts retained and the seven new posts proposed.[29] The construction process was improved through the use of another series of standardized plans developed by the Quartermaster Corps.

The Quartermaster Corps had to meet the needs of a rapidly growing Army, as their mission became more internationally focused during the Spanish American War. To accommodate this growth, as well as improve the sanitation and quality of life on installations at a low cost to the Army, the Quartermaster Corps hired a number of architects and draftsmen to revise the existing standardized plans.[30]

The revised series of standardized plans designed smaller buildings to eliminate wasted space and the introduction of new buildings materials such as concrete and iron.[31] In addition, the series consisted of one set of plans with no regional variations.[32] The only variation was the type of construction material; the most popular was brick and wood frame with stone and concrete variations.[33] The Quartermaster Corps also developed plans in 1902 for non-military buildings on posts such as exchanges, schools, libraries, gyms and bowling alleys.[34]

The Army continued to incorporate popular city planning and design concepts into post layouts.[35] Although there was no formalized policy regarding post layouts, only that they should be aesthetically pleasing, contemporary planning principles frequently appeared in the design of installations.[36]

[29] *Context Study*, 39.
[30] Ibid.
[31] Ibid.
[32] Ibid.
[33] Ibid.
[34] *Built on Strong Foundations*, 18.
[35] Ibid.
[36] *Context Study*, 39-40.

This was due to the hiring of civilian architects by the Quartermaster Corps or the hiring of private architectural firms to prepare plans for various installations.[37] These architects, familiar with the popular trends in city planning, integrated the contemporary principles of Beaux-Arts design into the new post layouts, such as locating buildings along a main axis and grouping buildings in formal spaces.[38]

The majority of Army installations were improved at this time, but the coastal fortifications saw little improvement or expansion with regards to construction. They did receive additional batteries of guns surrounding the forts and new sighting and communication equipment as the Army entered into the Spanish American War.

One aspect of the Army that developed greatly during this era was the Army's educational system. As the Army moved towards becoming a professional modern force, education of its officers and soldiers became essential. The Army expanded its educational system to include specialized schools for almost every department in the Army, such as the Ordnance School at Sandy Hook Proving Ground, New Jersey; Field Artillery School at Fort Sill, Oklahoma; and the relocation of the schools for the Signal Corps, Corps of Engineers, and Medical Department to Fort Leavenworth, Kansas. The Army War College was also established in 1901 at Washington Barracks (later Fort McNair, Virginia) to train senior officers in the art of war and assist with the creation of strategic plans.

Army War College (lower right corner) located at Fort McNair, Virginia became a vital part of the Army's educational system. ca. 1919
U.S. Naval Historical Center, Photo # NH91097-A

[37] *Context Study*, 39-40.
[38] Ibid.

Army aviation was another important aspect of the military developed at this time. Prior to 1908, Army aviation did not exist, but by the end of the era, aviation became an integral part of the Army. Army aviation began with the first test flight of a Wright brothers' plane at Fort Myer, Virginia in 1908. Soon after the successful test, the Wright brothers began to train Army pilots in College Park, Maryland. In 1911, the aviation program expanded with the purchase of seven airplanes and the establishment of the College Park Airfield as a semi-permanent school. The school was moved to San Diego, California in 1913. Aviation proved highly useful for Army reconnaissance and was incorporated into the Signal Corps in 1913; the new Aviation Section was comprised of 60 officers. The airfields that followed in 1916 were designed with the assistance of prominent architect, Albert Kahn.

Navy

The Navy made vast improvements during this era as it went from being ranked twelfth amongst the world navies in 1889 to a Great White Fleet rivaling England's naval power in 1907. In order to achieve this transformation, the Navy integrated new naval technologies into its ships, resulting in the further development and improvement of its shipyards.

To accommodate the Navy's new steel warships and other naval advancements, facilities at Navy shipyards also needed to be upgraded to include features such as a modern dry dock equipped to handle the largest warship. Since the New York shipyard could not handle the increase in workload, the Navy acquired the Puget Sound Naval Shipyard in Washington in 1891. However, the majority of the Navy's ships continued to be constructed through private shipyards, which had proved more economically feasible over the years.

Documentary postcard of the Puget Sound Naval Shipyard, Washington published by C.P. Johnston Company of Seattle, Washington. The shipyard was acquired by the Navy in 1891. Photo courtesy of Michelle Michael

To improve their status amongst the world naval powers, the Navy improved the appearance of their shipyards by incorporating the fashionable Beaux-Arts principles in their buildings and landscapes.[39] The Naval Observatory, Washington, D.C.; Naval Academy, Annapolis, Maryland; and the Naval Training Station Great Lakes, Illinois, all portray the Beaux-Arts principles in their community plans and buildings constructed at this time.[40]

Due to the rapid development of naval technology, the education system also was constantly changing to train its officers and enlisted men on the latest technological developments. The Navy abandoned their traditional recruiting ships in 1904 and established training stations at Newport, Rhode Island; Norfolk, Virginia; and San Francisco, California; and one at Great Lakes, Illinois in 1905.

With the new system, the recruits would receive training on shore for a few months, then join the fleet. The Navy also initiated several new schools to train seamen in specialized fields. By 1915, the Navy had the following schools established at its Norfolk, Philadelphia, New York and San Francisco yards: electric, machinists', torpedo, coppersmith, fuel-oil, artificer, yeoman, commissary, musicians and mess attendant. As evidenced by the creation of these schools, Navy yards at this time assumed new roles as naval shore installations. A majority of the yards would also add personnel support to their responsibilities when the Navy assigned each ship in its fleet a home port or shipyard. Although the seamen continued to live on ships or live near the installations, the shipyards did provide support facilities for the seamen and their families, such as commissaries.

Two significant innovations in naval warfare were developed during the early 1900s, the submarine and airplane became part of the naval military force. In 1900, the New London, Connecticut coaling station was converted into the first submarine base. Naval aviation developed at the same time as the Army Air Corps, with successful take off and shipboard landing attempts in 1910 and 1911 by Lieutenant Eugene Ely. The Navy created its aviation school at Pensacola, Florida in 1914 and, by April 1917, the Naval aviation program consisted of 48 pilots with 54 airplanes.

Marine Corps

The Marine Corps was deployed as a separate fighting force during the United States involvement in numerous international conflicts during this time period. Prior to the 1890s, the Marines primarily functioned as ship guards and protectors of shipyards. This changed as the Marines successfully completed landing duties, securing areas in Latin American and Hawaii during the Spanish-American War.

[39] *Built on Strong Foundations*, 20.
[40] Ibid.

As the Marines' mission transformed into the defense of advancing forces and providing intervention in international conflicts, the Marine Corps required additional space to operate and train.

The Marine Corps remained stationed at Navy shipyards, but developed their facilities on these shipyards to include one or two barracks, officers housing, and support buildings arranged in a formal layout with the barracks facing a parade ground.[41] Although the Marine Corps had space on Navy yards, they still needed additional space to support their increasing mission. In 1905, the Marines acquired a Marine Corps Depot in Philadelphia, Pennsylvania for the purpose of manufacturing Marine uniforms and equipment and storing Marine supplies. In 1915, the Marines acquired the closing Navy shipyard at Port Royal, South Carolina to use as a recruit depot. The training center was originally called the Marine Corps Barracks at Port Royal but later become known as Parris Island.

Like the other military services, the Marine Corps recognized the importance of education and began to establish its own education system. By 1915, the Marines developed several schools at Navy shipyards and its own installations including the Marine Officers School at Port Royal; the School of Application at Marine Corps Headquarters, Washington, D.C.; the Advanced Based School, Philadelphia, Pennsylvania; the Field Artillery School, Annapolis, Maryland; and the Machine Gun School, Pensacola, Florida.[42]

3.2.5 World War I, 1917 – 1919

As the modernization era of the military came to a close, the transformed United States military force had to quickly apply their new technologies and developments in an international war arena. Since 1914, various European countries had been engaged in a grueling war, World War I. The United States maintained a neutral position until April of 1917, when several events prompted by Germany threatened the security of the country. Once the United States declared war on Germany, all military services launched a massive mobilization effort to prepare its soldiers for war.

Army

The Army expanded to 62 divisions to meet the demands of war and were immediately faced with the challenge of providing shelter for thousands of soldiers as they trained to became an organized force. The mobilization effort of the Army greatly influenced the development of its installations in terms of expansion of existing posts and the creation of new encampments.

[41] *Built on Strong Foundations,* 20.
[42] Ibid., 17.

During this time, the Army began to construct temporary encampments. By September 1, 1917, the Army planned to construct 32 training camps with the capability of housing 40,000 soldiers each. The Quartermaster Corps was responsible for the construction and quickly expanded on their existing standardized plans to create "a comprehensive set of interchangeable standard plans for a camp".[43] This new series of plans were named the "600 Series" after the prefix 600 that appeared in the drawing numbers.[44]

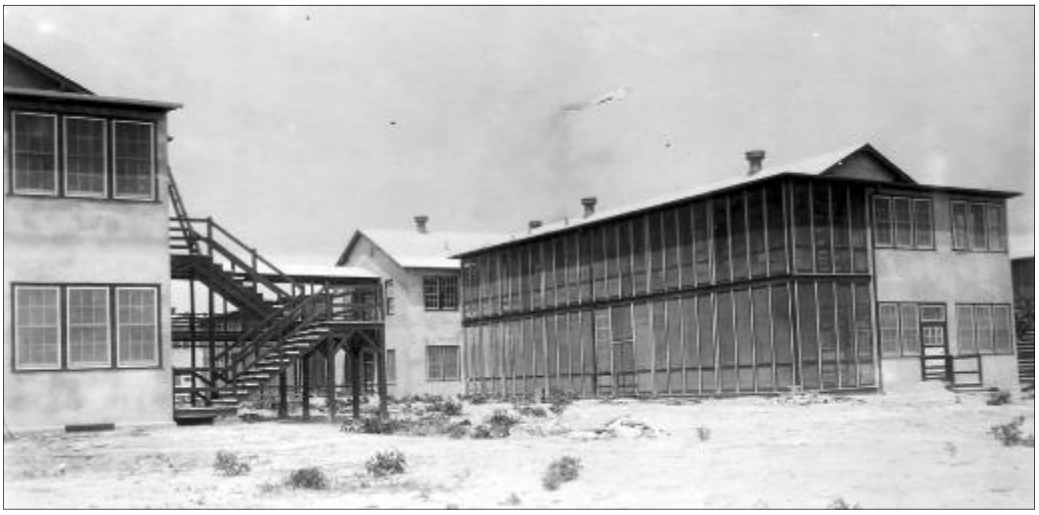
As in the previous years, the Quartermaster Corps, enlisted the help of architects, landscape architects and planners from the private sector to develop the plans. Colonel Issac W. Little managed the Cantonment Division of the Quartermaster Corps and established a committee (known as the Starrett Committee) of prominent leaders in the fields of architecture, planning, and engineering to design these new standardized plans. The Starrett Committee included such members as William A. Starrett (architect and head of committee), Frederick Law Olmsted, Jr. (landscape architect), Leonard Metcalf (designer of water and sewage systems), George B. Ford (planner) and engineers George W. Fuller and Asa E. Phillips along with other members of the National Council of City Planning, the American Institute of Architects and the American Society of Landscape Architects. Although a majority of the construction consisted of utilitarian wooden buildings, a tremendous amount of thought was applied to the architectural and planning concepts used to create camps that would contain sanitary and adequate living quarters and support buildings.

One of the Committee's greatest accomplishments was the creation of typical plans that could be adapted by individual camp sites depending on the type of unit or size. These plans organized buildings into groups according to a grid-like pattern and military regiments were separated based on rank and hierarchy.[45]

[43] *Context Study*, 41.
[44] Ibid.
[45] Ibid.

There were two types of camps constructed: National Guard and National Army. The National Guard encampments usually consisted of canvas tents to house the soldiers and a few wooden support buildings.[46] Due to this design, a majority of National Guard camps were placed in the southern states for the warmer weather. The National Army required longer training periods and, therefore, their buildings needed to last longer. The buildings were constructed of wood.[47] Typical building types at Army camps included barracks, mess halls, administration buildings, stables, warehouses, laundries, library, hospitals, and post offices. By the end of 1917, the Army reached its goal of 32 camps with 16 dedicated to the National Guard and the remaining 16 to the Army.[48]

Several training camps constructed during this time later became permanent Army installations including Fort Dix, New Jersey; Fort Lewis, Washington; and Fort McClellan, Alabama. The Army constructed facilities for specialized training camps such as a Signal Corps camp near Fort Monmouth, New Jersey; a field artillery range at Camp Bragg, North Carolina (later Fort Bragg); an engineer school at Camp Humphreys, Virginia (later Fort Belvoir); and Camp Joseph F. Johnson, Florida for the Quartermaster Corps.



World War I era hospital constructed at Camp Bragg, North Carolina, ca. 1918.
(today known as Fort Bragg).
National Archives 61844 Box 468 Bragg Hospital

[46] *Context Study,* 41.
[47] Ibid.
[48] Ibid.

The World War I era also saw the expansion of the Army aviation section, as aerial reconnaissance became an integral part of the World War I defense. At the outbreak of the United States involvement in the war, there were several airfields in existence, including Langley Field, Virginia, Camp Kelly near Fort Sam Houston, Texas, Mitchell Field, New York, and fields in Hawaii and the Philippines. The 1917 Aviation Act authorized the construction of additional airfields, aircraft, supplies and personnel, which facilitated the expansion of airfield facilities to a total of 33 Army airfields.[49]

1918-1920 view of Langley Air Force Base, Virginia constructed during World War I as part of the Army's aviation program. Photo courtesy of the Department of the Air Force

The typical airfield plan had 12 wood frame hangars aligned on the flight-line with barracks, administration and support buildings.[50] After the war, some of these airfields became permanent airfields such as Mather Field, California; Brooks Field, Texas; Kelly Field, Texas; Scott Field, Illinois; Chanute Field, Illinois; Selfridge Field, Michigan; Wilbur Wright Field, Ohio; Pope Field, North Carolina; Bolling Field, Washington D.C.; and Mitchell Field, New York. To support aviation activities, the Army established other facilities for use as aviation supply depots, general aviation depots and acceptance parks for receiving aircraft from the manufacturers. The majority of buildings on aviation installations were temporary wood buildings that utilized standardized plans. Typical building types included hangars, research laboratories, and housing.[51]

[49] *Built on Strong Foundations*, 24.
[50] *Context Study*, 48.
[51] *Built on Strong Foundations*, 24.

Navy

The Navy's involvement in World War I required the expansion of the Navy fleet and by default expansion of the Navy's installations. The Navy's installations utilized two forms of construction: temporary and permanent. The majority of support facilities, such as barracks and mess halls, were of temporary construction to conserve available resources. The permanent construction materials were mostly reserved for facilities involved with the industrial functions of the shipyards, which had to hold the weight of the equipment and ships. Such buildings included machine shops, structural shops, cranes, and foundries, which were all constructed of steel frame. Other steel frame structures developed were shipbuilding slips, launching ways and large cranes for the construction of steel vessels.[52]

Other additions to the Navy's real property inventory included the creation of Fleet Supply Bases in Brooklyn, New York and Norfolk, Virginia, and an operating base, the Norfolk Naval Base, Virginia in 1917. The Norfolk Naval Base, the original site of the Jamestown Exposition in 1907, functioned as the main hub for the Atlantic fleet, providing all vessels in the fleet with logistical and personnel support. The base had several facilities including a naval aviation station, storage facilities, drill and training facilities, barracks for enlisted men, and an auditorium.

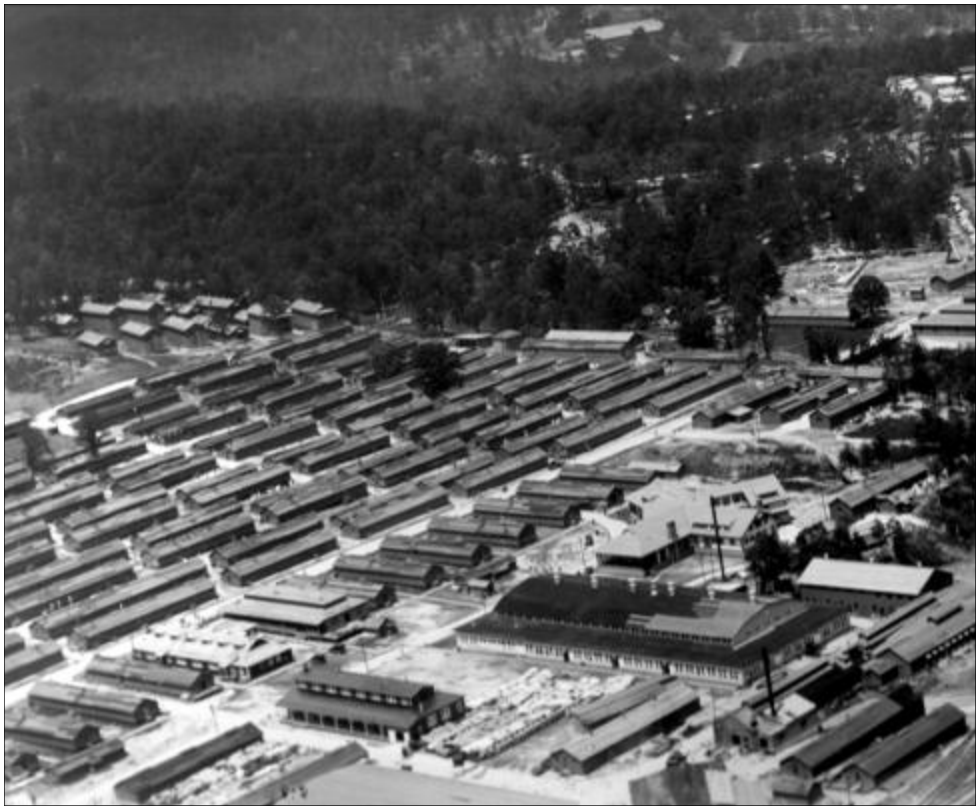
Hospital buildings, such as the one above, were constructed on Navy installations to support military personnel. Hospital, Philadelphia Navy Yard, Pennsylvania, ca. 1919.
National Archives, 71-CA Box 389 Philadelphia Navy Yard Hospital, Box 2926

[52] Ibid.

Marine Corps

Unlike the Army and the Navy, the Marine Corps did not experience great expansion at its installations during World War I. They did, however, expand the Marine Corps training program to include the establishment of another training installation at Quantico, Virginia. The base at Quantico concentrated on the advance training of its officers and enlisted men, but also functioned as a replacement depot for troops deploying overseas. The permanent construction at Quantico did not occur until after the war; the original construction of the installation consisted primarily of tents.

The most significant alteration of the Marine Corps occurred in combat, as their mission expanded to serve with the Army forces during the war. This expansion of their mission and their capability of operating brigade size units allowed the Marine Corps to gain independence from the Navy in both mission and organization and later in the development of its installations.



1919 Aerial of the Marine installation at Quantico, Virginia.
National Archives, 80-G Box 1930 Quantico Aerial May 1919, Box 457001

3.2.6 The Inter-War Years, 1919 – 1940

The aftermath of World War I left the United States with severe debt which impacted future military development. The stock market crash of 1929 and the Great Depression further hindered military development. As a result, construction on military installations depended largely on the sale of surplus property and funding associated with the Works Progress Administration and Public Works Administration; as well as public relief programs of the 1930s.[53] These programs allowed the military to develop permanent facilities at existing installations. The era represented a period when the military could dedicate the time and resources to redevelop its installations and improve their functionality and living conditions.

Army

The postwar years for the Army were a time committed to the improvement of buildings and landscapes on their installations, with the main goal of providing adequate shelter for their soldiers. The Army retained a number of World War I temporary training camps after the war but the lack of funds resulted in the rapid deterioration of the buildings. To improve their installations, Congress enacted Public Law No. 45, which allowed the Army to dispose of 43 military installations or portions of them and all proceeds went into a "Military Post Construction Fund". In the first year the Army used the money to improve enlisted barracks and hospitals. The next year they expanded the improvements to include post landscaping and an overhaul buildings. Throughout the 1920s and 1930s, the Army utilized Quartermaster Corps standardized plans to create posts that "combine military tradition with the design concepts of city planning and landscape architecture."[54]

The Quartermaster Corps again hired a committee of civilian architects, planners, engineers and landscape architects to review post plans.[55] This time, George Ford, a former member of the Starrett Committee, was influential in incorporating the current planning concepts of the City Beautiful and Garden City movements into post plans.[56]

[53] *Built on Strong Foundations*, 27.
[54] *Context Study*, 55.
[55] Ibid.
[56] Ibid.

The ideals of creating vistas and open spaces were incorporated by creating pleasant environments such as these portrayed in the layouts of Fort Lewis, Washington and Fort Bragg, North Carolina.[57] Additional features integrated into post plans were curvilinear streets, open spaces, large avenues, and streets and landscaping.[58]

1938 Aerial of Fort Bragg, North Carolina depicting the use of open spaces, curvilinear streets and large avenues in its post layout. National Archives RG-342 FH Box 1060-B17349

This new phase of standardized plans allowed for greater flexibility to tailor plans to the regional and environmental conditions of the post.[59] Each geographical region utilized a particular architectural style or influence. The East Coast, Midwest and Pacific Northwest used the Georgian Revival style and the South, Western Plains, Southwest and California used the Spanish Colonial Revival. Other styles or influences applied to post buildings were English Tudor Revival and French Provincial, also referred to as French Eclectic.[60]

In addition to buildings, landscaping became an integral part of a post's layout during the late 1920s and early 1930s. Plantings and shrubs complimented the buildings and, by 1931, the Quartermaster Corps had created landscape designs that could be applied to any installation.[61] Such design criteria included: the "use of trees and shrubs to screen objectionable views; frame interesting views and accentuate points of interest; separate functional areas; moderate harsh environmental conditions through soil erosion control and planting trees for shade".[62]

[57] *Context Study*, 55.
[58] Ibid.
[59] Ibid., 48.
[60] Ibid.
[61] Ibid., 57.
[62] Ibid.

A few years later, the Landscape Unit of the Quartermaster Corps developed standardized plans of plantings for several post buildings including family quarters, headquarters, bachelor officers' quarters, and barracks, as well as the theater, chapel and hospital.[63] These plans applied the popular planting styles of the 1920s and 1930s and planting materials could be substituted to fit the environment of different regions.[64]

As living conditions on the installations improved, the function of the installations were expanded to include training of National Guard units, R.O.T.C (Reserve Officers' Training Corps) cadets and C.M.T.C (Citizens Military Training Camp) volunteers, as well as the addition of special service schools (Infantry, Engineer, Artillery, etc).

The Army Air Corps also developed permanent installations around their airfields. The majority of the existing airfields were temporary in nature with wood buildings and sod or gravel runways and were in disrepair by the 1920s. Under the same legislation as the Army (Public Law 45), the Air Corps were able to improve their post conditions. They received additional funding through the Air Corps Act of 1926, which also changed the name of the Air Service to Air Corps.

The permanent layout of the airfields varied, however, most seemed to follow a plan with a bilateral symmetry.[65] For example, March Field, California had a square plan with the runway located on the square's diagonal axis.[66] The airfields contained numerous buildings to support aviation operations and their airmen including the following: barracks, quarters, shops, warehouses, oil and gasoline storage buildings, hangars, laboratories, hospitals and schools.[67] All building designs were standardized plans developed by the Quartermaster Corps. Along with the buildings, the runways were extended and paved with hard-surfaces, and intersecting runways were introduced to accommodate the new planes and aircraft technology.[68]

Navy

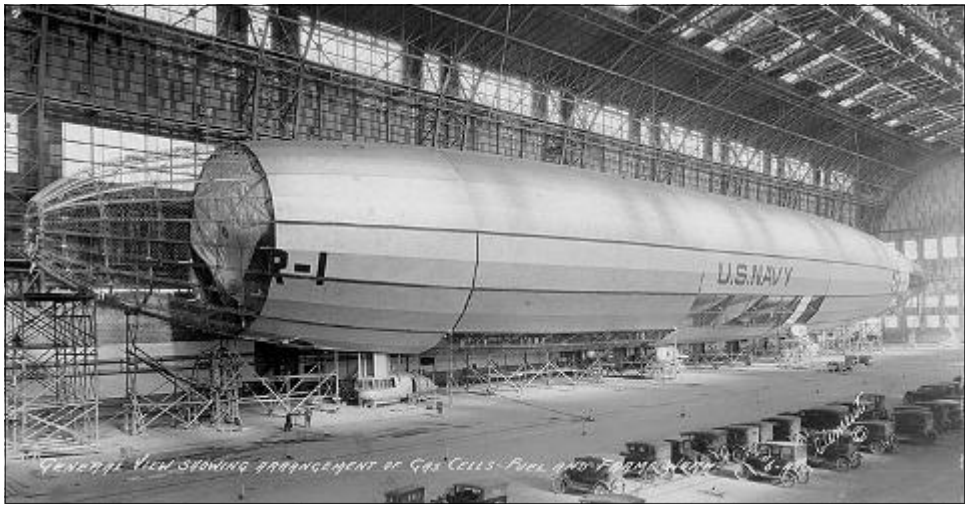
After World War I, the development of the Navy and its installations was largely affected by multiple disarmament agreements and the threat of war with Japan. To accommodate the disarmament agreements of the 1920s and 1930s, the Navy reduced the size of its fleet and issued a five-year moratorium on ship construction beginning in 1930. Although Navy development was hindered by the agreements, they continued to improve and expand their installations, especially those on the Pacific Coast and in Hawaii.

[63] *Context Study*, 58.
[64] Ibid.
[65] Ibid., 49.
[66] Ibid.
[67] Ibid., 50.
[68] Ibid., 49.

As the United States Navy feared Japanese attack, they recognized the weaknesses of their existing West Coast installations and searched for more sufficient shore installations. Three existing installations emerged as the leading installations; improvements began slowly at first in the 1920s and accelerated in the 1930s to transform these installations to support a Pacific fleet. These installations included San Diego, California as a Naval Operating Base; Puget Sound Naval Shipyard, Washington as a shipbuilding operation; and Pearl Harbor, Hawaii as a major repair and supply installation.

Due to the success of the submarine and aircraft during World War I, facilities for both were improved as they became essential in naval operations. The Navy constructed fleet aircraft bases at the existing bases of Norfolk, San Diego and Pearl Harbor along with aircraft maintenance training at the Great Lakes Training Station, Illinois and aircraft research and development at the Anacostia Naval Station, Washington, D.C. In addition, the naval air stations at Lakehurst, New Jersey and Moffett Field, California were established to support the new lighter-than-air crafts. The Navy also assigned two of its existing installations, New London Naval Base, Connecticut and Portsmouth Navy Yard, New Hampshire, the new mission of supporting submarines. New London operated as a submarine base and training facility, whereas Portsmouth was charged with submarine construction.

The new Navy installations constructed at this time contained military and non-military buildings including recreational facilities, dispensaries, enlisted quarters, officers housing and mess halls.[69] Similar to the Army, Navy installations exhibited the current trends in city planning and architecture.[70]



USS Shenandoah, in hangar at the naval station in Lakehurst, New Jersey in 1924.
U.S. Naval Historical Center, Photo # NH82258

[69] *Built on Strong Foundations*, 29.
[70] Ibid.

Marine Corps

During the years between the wars, the Marine Corps developed into the Fleet Marine Force in the 1930s, with an emphasis on amphibious operations to support naval campaigns. In support of their new mission, the Marine Corps retained their own installations at Parris Island, South Carolina; and Quantico, Virginia as well as their facilities at Navy installations.

Due to limited funds during this time, the Marine Corps made minimal improvements to their installations. However, the Marines did acquire a new recruit depot in San Diego in 1919 to increase their presence in the Pacific. The Marines also added airfields at all three of their installations.

1930 aerial of the Marine Corps Recruit Depot San Diego, California.
National Archives 71-CA Box 476 8890 Marine Corps Barracks (MCRD) San Diego
Aerial September 1930

3.2.7 World War II, 1941 – 1945

At the end of the 1930s, the world was once again at war. Japan and Germany invaded their neighbors to expand their territories, resulting in a war involving most of Europe and Asia. The United States was able to remain neutral until December 7, 1941 when Japanese forces attacked the Pacific Fleet stationed at Pearl Harbor, Hawaii.[71] A day later the United States declared war on Japan and soon after declared war on Germany initiating the United States' involvement in World War II. The United States military quickly responded with a massive mobilization effort.

Prior to the declaration of war in 1941, the military had seen some expansion as part of President Roosevelt's Protective Mobilization Plan, but in 1941 expansion of the military was accelerated.[72] Both military services experienced rapid growth in recruitment causing the expansion of their facilities. At this time, military construction consisted of the permanent construction of ammunition production facilities and coastal artillery batteries and the temporary construction of mobilization training camps.[73]

Army

Between 1941—1942, the Army grew tremendously, achieving a strength of 4,250,000 soldiers.[74] The rapid growth in recruitment resulted in the Army utilizing mobilization training camps, similar to those used in World War I. One hundred and eighteen camps and 72 Army Air Corps camps were established utilizing land on existing installations or through the creation of new temporary installations.[75]

As stated earlier, after war broke out in Europe in 1939, President Roosevelt expanded the Army and the Quartermaster Corps developed construction plans in anticipation of the military expansion and the pending war.[76] Three sets of plans evolved from the 600 series of World War I, which included the 700 series, 800 series and the Modified-Theater-of-Operations (T.0.) series.[77]

[71] *Built on Strong Foundations,* 34.
[72] Ibid., 33.
[73] Ibid.
[74] Ibid., 34.
[75] Ibid., 35.
[76] *Context Study*, 51.
[77] Ibid.

The plans included designs for the following temporary wood building types: barracks, mess halls, hospitals, dispensaries, guard houses, fire stations, control towers, freight terminals and other such buildings along with plans for site layouts and utilities.[78] The construction program using the 700 series plans began in the fall of 1940, the 800 series was introduced in 1941.[79]

The 800 series plans were a revised version of the 700 series with larger barracks and more semi-permanent buildings.[80] Both construction programs assisted the Army with providing adequate shelter and training facilities for their recruits.[81] In 1941 the Quartermaster Corps were relieved of their construction duties by the Army Corps of Engineers. However, the Corps of Engineers continued to use the standardized plans developed by the Quartermaster Corps.[82]

In addition to the mobilization training camps, the Army constructed general hospitals and support facilities such as industrial production plants and depots.[83] Another construction project undertaken by the Army was the creation of the Pentagon to house the War Department (Army).[84] Construction of the five-sided building began in 1941 and was completed in 1943.[85]

Construction of the Pentagon in 1941. Photo courtesy of the U.S. Army Corps of Engineers

[78] *Context Study*, 52.
[79] Ibid., 52-53.
[80] Ibid., 53.
[81] Ibid.
[82] Ibid., 64.
[83] *Built on Strong Foundations*, 39-40.
[84] Ibid., 37.
[85] Ibid.

Navy

The Navy also experienced tremendous growth at this time and relied on temporary buildings to expand their existing installations and establish new installations. To accommodate the large number of recruits, the Navy constructed three more recruit training stations.[86] The Navy aviation section also expanded to include 79 airfields, mostly of temporary construction.[87] The typical Navy temporary buildings consisted of H-shaped, two-story, wood frame barracks; arched laminated wood truss drill halls; and an arched metal Quonset huts.[88]

Row of Quonset huts at Navy installation in Green Cove Springs, Florida, ca. 1940s. National Archives, 71-CP Box 21, Green Cove Springs, Florida

[86] *Built on Strong Foundations*, 35.
[87] Ibid.
[88] Ibid.

Marine Corps

The Marine Corps also grew in strength during World War II, resulting in the expansion of existing installations at Quantico, Virginia and Parris Island, South Carolina. The Marines constructed a new installation at Cherry Point, North Carolina in 1941 and Camp Pendleton, California in 1942 to further accommodate their growth in recruits.[89] The Aviation section expanded with the creation of six temporary airfields on the West Coast.[90] The expansion of the Marine Corps facilities during the war consisted of primarily temporary buildings like those of the other military services.

Construction of 60 bed ward buildings for Naval hospital at Parris Island, South Carolina in 1941. National Archives, College Park, RG71-CA Parris Island, SC

3.2.8 The Cold War Era, 1946 – 1989

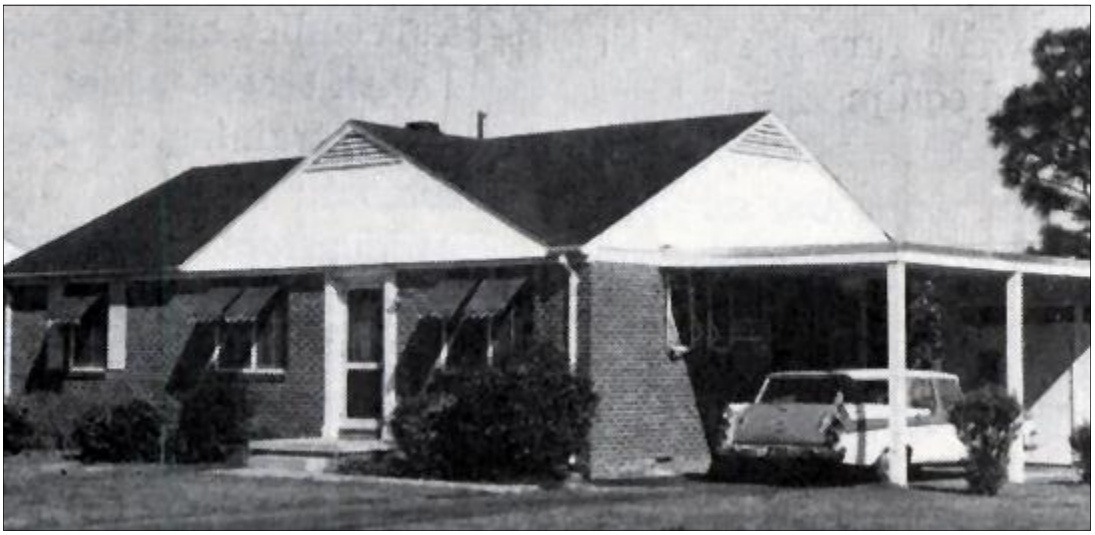
The Cold War began after World War II ended as the United States realized the Soviet Union's intentions to expand its territory in Europe. Following World War II, the United States military reduced in size and several facilities including training camps and ammunition production facilities were closed or placed on standby status. As the Cold War continued into the 1950s, the military initiated a period of expansion with the construction of facilities to support the new technologies of nuclear weaponry and space exploration along with facilities for normal base operations and training. The majority of military construction during this era included the following types of facilities: research and development, testing and evaluation, training and education, and logistical and operational support.[91]

[89] *Built on Strong Foundations*, 35.
[90] Ibid.
[91] Ibid., 43.

Army

The Army's primary focus during the Cold War was support of its new strategic role as ground forces prepared to fight, ready to deploy rapidly and to be flexible on the battlefield.[92] The Army modernized its materiel with the development of nuclear weapons and various missile types.[93] This necessitated the construction of facilities to store the new materiel, research and testing laboratories, and schools to train soldiers in the new technology and warfare tactics.

Living conditions at Army installations were also improved with the construction of permanent buildings to replace World War II temporary buildings. Standardized plans were developed for headquarters, administration buildings, motor pool buildings, chapels, mess halls, barracks and other support buildings. Along with barracks, the Army, through the Wherry and Capehart programs, constructed family housing utilizing suburban planning concepts of neighborhoods with curvilinear streets and modern building materials of concrete, brick veneer and steel windows.



House constructed through the Wherry program at Fort Bragg, North Carolina. ca. 1950s
Photo courtesy of Fort Bragg CRMP Archives.

[92] *Built on Strong Foundations*, 44.
[93] Ibid.

Navy

The Navy improved their fleet during the Cold War era with the development and construction of jet planes, larger aircraft carriers and more efficient submarines.[94] Facilities were constructed to support the new and improved fleet in terms of research, construction and repair, and training. The Navy also improved their base operation facilities at this time to include new barracks, family housing and other support facilities.

Marine Corps

Similar to the Navy, Marine Corps installations improved their facilities with the construction of permanent base operation buildings during this era. The Marine Corps also expanded their training facilities at this time to include a cold weather orientation center in the Sierra Nevada Mountains of California and an artillery and missile range at Twentynine Palms, California. [95]

Recreational facilities were constructed on Navy and Marine Corps installations during this era.
Golf Clubhouse at the Marine Corps Air Station in Kaneohe, Hawaii in 1953.
National Archives, 71-CP Box 55 MCAS Kaneohe Golf Course Clubhouse 16 June 1953

[94] *Built on Strong Foundations,* 43.
[95] David F. Winkler, *Training to Fight: Training and Education During the Cold War,* (Champaign, IL: Construction and Engineering Research Laboratory:1997), 51.

Air Force

The Cold War era saw the creation of the Department of the Air Force as its own separate aviation service. The Air Force inherited airfields once operated by the Army Air Corps. However, additional installations and expansion of existing airfields to accommodate the modern aviation technology and its new mission in nuclear warfare were required.[96] Runways were lengthened and strengthened to support heavier aircraft and the new bombers and jets.[97] Support facilities had to be developed to accommodate the new aircraft including larger hangers, taller control towers, fuel storage facilities and dispensing stations.[98] Another feature was the addition of missile silos and other nuclear technology facilities in strategic locations to defend the country against nuclear attack.[99] Air Force installations constructed permanent base operation facilities such as headquarters, barracks, chapels, family housing (Wherry and Capehart programs) and other support facilities.

Cold War era building and missile shelters constructed as part of the air defense program. (Present-day photos) McGuire Air Force Base, New Jersey

[96] *Built on Strong Foundations, 43.*
[97] Ibid.
[98] Ibid.
[99] Ibid.

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4.1 Description of Architectural Influences

Modern style building at United States Air Force Academy. Harmon Hall.
United States Air Force Academy, Colorado

The architectural influence of a building is evident in its shape, materials, details and other features that distinguish one building from another. There are many architectural influences found in the United States. These influences evolved as national trends and regional tastes changed. Therefore, architectural influences not only can indicate the time or period of a building's construction, but also the mindset of the country and region at that time. Buildings on military installations are no exception, and their architectural influences reflect the evolution of the installation, the military services and DoD.

The National Park Service recommends three steps when identifying architectural influences and their character-defining features. [As a note, character-defining features are the functional and decorative elements that are distinctive to a building including but not limited to: windows, doors, porch, roof shape and decorative trim. Together these features depict a particular architectural influence and provide the building with its visual character.] The steps to identifying architectural influences are:

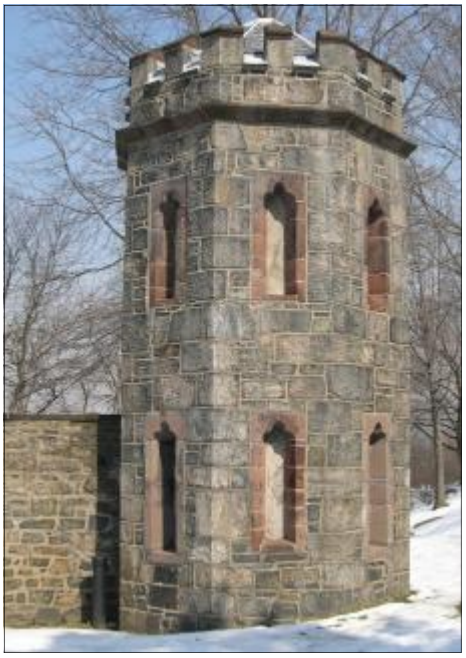
STEP ONE: Examine the exterior of the building from a distance by looking at the building's overall visual character and noting distinctive features of the building site and landscape.

STEP TWO: Examine the visual aspects of the exterior of the building at close range by looking at the materials, surface treatments and craftsmanship.

STEP THREE: Examine the interior of the building by looking at the configuration of the interior spaces, and the features and finishes.

These steps also can be used to determine character-defining features of building types and regional design variations or vernacular buildings.

For further guidance on the identification of architectural influences, consult the National Park Service *Preservation Brief 17, Architectural Character Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character* and their interactive website, *What is the Historic Character?* at http://www.nps.gov/history/hps/tps/walkthrough/start.htm. Also see Chapter 17, "Sources for Additional Information by Subject Area" for a list of additional resources related to architectural influences.



Gothic Revival style tower and wall built in granite.
United States Military Academy, New York
Photo courtesy of Travis Beckwith, CRM-USMA

Old Military Affiliated Radio Station (M.A.R.S) designed in the International style. Fort Monroe, Virginia
Photo courtesy of ERDC-CERL

Quarters designed in the Spanish Colonial Revival style.
Fort Benning, Georgia
Photo courtesy of Fort Benning CRMP

4.2 Military Architecture

DoD installations include a diverse collection of buildings, representing a unique architectural record of military acquisitions and construction as the military evolved over time. Military architecture, as a whole, represents the different eras of military history as well as the culture of the United States at various time intervals and geographical regions. Thus, it is the infusion of architectural design with the functionality of military life.

This chapter serves as a guide to assist users with the identification of the decorative and functional features associated with a building that contribute to its historical significance. There are two main categories of military architecture: 1) Military Constructed and 2) Military Acquired. Military Constructed includes those buildings constructed by the military which typically involved the use of standardized plans for specific building types and buildings that usually exhibit a particular architectural influence. Military Acquired incorporates those buildings acquired by the military that typically represent local building traditions as well as regional design variations of an architectural influence. These categories of military architecture are discussed in further detail below; and the final section, 4.3 "Illustrated Guide of Military Architecture," provides a list of the character-defining features of a particular architectural influence, which is supplemented by a sampling of examples for each architectural influence. The examples show the range of features that may appear on a building because some buildings might contain all the associated features of an architectural influence, while others might only portray one or two features. As a caveat, the list of character-defining features does not include all the features of an architectural influence and not all the features in the list will be demonstrated in the examples. Additionally the section contains representative examples of building types and military acquired buildings to demonstrate the types of features that might be portrayed on these buildings.

4.2.1 Military Constructed – Architectural Influences and Building Types

The majority of buildings on military installations are representative of a particular building type and/or architectural influence. This is primarily due to the utilization of standardized plans. Each branch of the military developed standardized plans to accommodate the needs of their forces in a cost effective manner. The plans created a template for installation layouts, sewage and utility systems, building types and landscaping.

The military designers responsible for the development of these plans were influenced by the popular planning and architectural trends occurring in the United States and often the military employed civilian architects, landscape architects and planners who also applied popular trends to their designs. As a result, standardized plans for buildings incorporated contemporary architectural influences and their associated features in elements like the overall form of the building, exterior and interior decorative details and floor plans. For instance, in the 1860s the Army developed their first set of standardized plans for housing, which consisted of

designs employing the fashionable architectural influences of that time period – Gothic Revival (1830-1875), Italianate (1840-1880), and Queen Anne (1870-1910). Although the plans applied architectural influences to the design of the buildings, most of the time, the plans were simplified or adapted to lower construction costs and increase the efficiency. For this reason, buildings might only depict a few features rather than fully representing an influence with all of its decorative and functional features. A good example of this is the Band Hall Building at Fort Sam Houston, Texas. The building's overall appearance is not dominated by the Romanesque Revival influence; however, the building depicts elements of the influence including its masculine stone arches above the front windows, and line of rectangular windows. Even though the building does not depict all the features common of Romanesque Revival, it is still considered an example of the influence albeit a simplified version.

Band Hall Building at Fort Sam Houston, Texas depicting a simplified version of the Romanesque Revival style.

Buildings can also represent stylistic mixtures in which elements of different architectural influences are combined in the design of one building. These buildings could have been originally built as stylistic mixtures or later attempts to remodel a building with a more contemporary design. Stylistic mixtures were a popular trend in American architecture that also appeared in military architecture.

Even though standardized plans provided a sense of uniformity, the plans were meant to be adapted by installations to accommodate differences in climate and to create character for each installation. For instance, Army plans historically stressed that each post should have a military atmosphere but they should also integrate the local character and traditions. This policy was usually met through variations of plans in terms of building materials, massing, size and ornamentation. For example, housing at Fort Riley, Kansas in the 1890s was constructed using standardized plans that employed the Queen Anne architectural design. Queen Anne buildings are typically constructed using wood or patterned masonry, but the buildings at Fort Riley were constructed using the local material of limestone. These buildings have unique exterior appearances compared to Queen Anne buildings constructed on other installations.

Another aspect of standardized plans are those that were developed for specific building types such as housing, hospitals, chapels, headquarters, classrooms, recreation facilities, hangars, storehouses, and power plants. The plans included specific architectural features needed to accommodate the function of the building type. For instance, many of the earlier plans for hospitals incorporated porches into their design whereas designs for hangars incorporated

door pockets to store the open hangar doors. Although most of the plans for building types were designed with an associated architectural influence such as officer housing and headquarters, several building types were not represented by an architectural influence or style including storehouses and other support facilities. In these cases, the buildings still have character-defining features but those features are associated with the building type rather than an architectural influence. For example, military service stations utilized standardized plans, which included character-defining features such as a one-story building with a full-width porch supported by piers or columns.

Example of a military service station Fort Lewis, Washington

Example of a WWII Temporary Barrack. Fort Leonard Wood, Missouri Photo courtesy of ERDC-CERL

Furthermore, World War I and World War II standardized plans eliminated architectural influences to cut down on construction costs and time. The buildings are utilitarian in character and exhibit features important to the building's function. For instance, World War II mess halls were one-story buildings with a central door and an open floor plan to handle an influx of troops. Barracks were two stories with exterior stairs, ladder fire escape, and windows spaced evenly on the side elevations to provide ventilation.

Also, prior to the development of standardized plans in the late 19th century, the men and women of the armed forces were responsible for designing and constructing their own quarters and support facilities. The majority of the time they did not design the buildings in an architectural influence but rather through building traditions known by the men and women and local materials available to them. Similar to the community buildings, these buildings were unique interpretations of architectural forms and features, which is typically referred to as vernacular architecture (see the discussion in Section 4.2.2 on vernacular buildings for additional information). For instance, a house at Camp Bullis, Texas was built by soldiers and has an interesting gable-on-hip roof form along with an engaged screened-in porch (see photo on the next page).

Military constructed buildings were mostly built using standardized plans for specific building types. Therefore, when identifying a building's character-defining features it is important to examine those features associated with an architectural influence as well as the features

associated with the building's type. As a whole, these features are vital to the character of a building and should be protected and preserved. Please consult the next section of this chapter, 4.3 "Illustrated Guide of Military Architecture," for further assistance with the identification of character-defining features of architectural influences and building types. For additional information, consult the section, "Military History and Historical Contexts," of Chapter 17, "Sources for Additional Information by Subject Area" for a complete list of historic contexts developed for different military building types.

This house built by soldiers has unique features such as a gable-on-hip roof and engaged porch. Camp Bullis, Texas

4.2.2 Military Acquired – Regional Design Variations and Vernacular Buildings

Even though the majority of military buildings were designed according to an architectural influence, there are several examples of buildings that do not depict a particular influence. Instead these buildings primarily represent local building traditions and regional design variations of contemporary architectural influences, often described as vernacular architecture since the design was not created by a professional architect. Typically, these types of buildings on military installations were acquired by the military during initial land acquisitions.

Buildings in this category portray the influence of the environment and tradition on a builder's interpretation of architectural design. The majority of local builders were inspired by existing building examples and architectural influences in their geographical region as well as the building traditions that have been passed down through word of mouth, observation, replication and apprenticeship. Building traditions include but are not limited to: techniques of construction, building forms, building materials and function or use in day-to-day activities. Through these influences, builders created their own interpretation of contemporary architectural forms and features resulting in innovative designs for buildings. Sometimes these buildings will embody features that are characteristic of an architectural influence or a combination of architectural influences. However, the features will be slightly different either in their placement, use or design.

On military installations, vernacular or regional design variation buildings were typically those buildings designed and constructed by members of local communities from which the military later purchased their land. In the 19th and early 20th century many houses, churches, stores and other community buildings in the United States were constructed and designed using local building forms, construction techniques and building materials.

For example, Sandy Grove Church at Fort Bragg, North Carolina was originally constructed in a vernacular Greek Revival tradition in the 1850s. However, the congregation updated the building in the early 20th century with pointed arches resembling the Gothic Revival architectural design and the addition of a steeple and vestibule. Another example is the 1920s store building constructed prior to military ownership at Fort Stewart, Georgia with its parapet roof and simple porch.

Vernacular buildings portray decorative and functional features important to the character of a building. These features include but are not limited to: the building's overall form and massing; types of windows and doors; wall ornamentation such as cornices or textured shingles; roof shapes; porches and other appendages; and decorative details such as brackets, exposed rafters and porch supports. Please consult the next section of this chapter, 4.3 "Illustrated Guide of Military Architecture," for further assistance with the identification of character-defining features of vernacular buildings as well as features that are interpretations of common elements of a particular architectural influence.

Store building portraying a regional design variation. Fort Stewart, Georgia

Sandy Grove Church designed and constructed by local community members in a vernacular building tradition. Fort Bragg, North Carolina Photo courtesy of Fort Bragg CRMP

4.3 Illustrated Guide of Military Architecture

Architectural Influences, various time periods

Georgian, 1700—1780, locally to 1830

Former military Commandants Quarters
Madison Barracks, New York
Photo courtesy of ERDC-CERL

Quarters 1, Commanding Officer's Quarters
Fort Monroe, Virginia
Photo courtesy of ERDC-CERL

Character-defining Features:

Side gabled, hipped or gambrel roofs

Symmetrical

Central door with transom

Paneled door with decorative crown supported by decorative pilasters and heavy millwork

Pedimented door

Double-hung windows, usually 9 over 9 or 12 over 12

Pedimented windows

Wide, shallow muntins

Cornice with dentil molding

Belt course

Quoins

Federal (also known as Adam), 1780—1820, locally to 1840

Quarters 100 with a later porch addition
United States Military Academy, New York

Former military Laborer's House, Jefferson Barracks, Missouri
Photo courtesy of ERDC-CERL

Quarters 17, Fort Monroe, Virginia, Photo courtesy of ERDC-CERL

Character-defining Features:

Symmetry of façade with a central door

Side-gable or hipped roof

6 over 6 double hung windows

Elliptical fanlight or transom over door with sidelights

Three-part window or Palladian window in center of upper floor

Paneled door

Cornice usually with dentil molding or other decorative molding

Front porticos with classical columns

Decorative details such as swags or festoons, quoins and pilasters

Belt courses

Curving stairs

Dormers usually front gable (as shown)

End chimneys

Roof balustrades

Cupolas

Early Classical Revival, 1770—1830, locally to ca. 1850

Old Cadet Chapel
United States Military Academy, New York
Photo courtesy of ERDC-CERL

Naval Hospital with a later addition of the dome
Portsmouth Naval Hospital, Virginia
Photo courtesy of ERDC-CERL

Character-defining Features:

Symmetrical

Façade dominated by full-height entry porch usually with triangular gable above supported by four columns

Usually 5 bays with central door flanked by 4 windows

Central door

Semi-circular or elliptical fanlight over door

Long, windows, usually 9 over 9 double hung

Round, semi-circular (lunette) and arched windows

Dome

Raised one-half story

Polygonal projection

Triglyphs

Roman order columns

Greek Revival, 1825—1860

Quarters, Norfolk Naval Shipyard, Virginia
Photo courtesy of the Department of the Navy

Quarters, Norfolk Naval Shipyard, Virginia
Photo courtesy of the Department of the Navy

Character-defining Features:

Symmetrical

Gabled or hipped roof

Entry porch or full-width porch supported by square or round columns

Central door with transom and sidelights

Elaborate door surround or enframement

Cornice with wide band of trim

6 over 6 double hung windows, window openings usually larger

Three-part windows

Window crowns or lintels

Gothic Revival, 1840—1880

Quarters 61, Poe House, Fort Monroe, Virginia

Quarters, United States Military Academy, New York

Cadet Chapel, later time period of influence ca. 1910
United States Military Academy, New York
Photo courtesy of Travis Beckwith, CRM-USMA

Character-defining Features:

Steeply pitched gable roofs

Parapets or castellated walls

Decorated vergeboards

Windows extend into gables

1 over 1 or 2 over 2 double hung windows or casement windows

Pointed or arched windows

Oriel or bay windows

Drip mold for window crowns

Tracery at top of windows

Paneled doors, elaborate or simple

Towers and turrets

Clover-like foils

One-story entry or full width porch

Chapel of the Centurion,
Fort Monroe, Virginia

Italianate, 1840—1885

Former military Commanding General's Quarters
Omaha Barracks, Nebraska, Photo courtesy of ERDC-CERL

Quarters, F.E. Warren Air Force Base, Wyoming

Quarters 15, Fort Monroe, Virginia

Character-defining Features:

Usually a low pitch hipped roof, sometimes front gable

2 or 3 stories, rarely 1 story

Symmetrical or asymmetrical façade

Groupings of windows

Tall, narrow arched or rectangular windows usually 1 over 1 or 2 over 2 double-hung sashes

One-story bay windows

Window crowns, hooded, bracketed or framed

Half-glazed paired doors, usually arched or rounded

Square cupolas or towers

Full-width porch or small entry porch

Square columns or columns with brackets

Wide overhanging eaves with decorative brackets

Octagon, 1850—1870

Pitch House
Norfolk Naval Shipyard, Virginia
Photo courtesy of Department of the Navy

Chapel
Naval Air Station Pensacola, Florida
Library of Congress, HABS FLA, 17-PENSA, 61

Character-defining Features:

Exterior walls arranged in octagonal shape (8 sides but some examples show 6-, 10-, 12- or 16- sided forms

Low pitched hipped roof

Cupola

Porches

Decorative details from Greek Revival, Gothic Revival or Italianate architectural influences

Some examples lack decorative details

Second Empire, 1855—1885

Former military residence
Vancouver Barracks, Washington

Former military residence
Presidio of San Francisco, California
Photo courtesy of ERDC-CERL

Character-defining Features:

Symmetrical and asymmetrical 2-stories, sometimes 1-story

Mansard roof

Patterned roof, usually slate or metal shingled

Eaves with decorative brackets

Dormer windows, round or square

Paired windows, usually 1 over 1 or 2 over 2 double hung

1-story or 2-story bay windows

Hooded or bracketed windows

Paired entry doors sometimes with glazing

One-story porch

Tower or cupola

Projecting central pavilion

Cresting along roof line

Classical details such as belt courses and quoins

Victorian Period, late 19th century

Stick (1860-1890); Queen Anne (1880-1910); and Shingle (1880-1900)

Former military residence (Queen Anne)
Vancouver Barracks, Washington

Lighthouse Keeper's House (Shingle), Fort Monroe, Virginia

Former military St. Peter's Chapel (Shingle),
Mare Island Naval Shipyard, California
Photo courtesy of ERDC-CERL

Character-defining Features:

Symmetrical or asymmetrical

Gabled or hipped roof, usually irregular roof line

Decorative trusses in gables

Horizontal and vertical bands

Overhanging eaves

Sunburst or texture in gables

Textured shingles

Patterned masonry

1 over 1 double hung windows

Paired windows

Bay windows

Classical details such as dentils, columns and Palladian windows

Partial or full-width porch usually 1-story

Decorative sawnwork such as beaded board

Romanesque Revival, 1870—1900

Administration Building
Fort Monroe, Virginia
Photo courtesy of ERDC-CERL

Band Hall Building
Fort Sam Houston, Texas

Character-defining Features:

Asymmetrical

Hipped roofs with cross gables

Masonry or stone walls usually with rough-faced or square stone-work

Sometimes polychromic stonework

Polychromed slate roof

Dormers, eyebrow, hipped and gabled

Rectangular windows, usually with stone transoms

Rows of windows, usually deeply recessed

Round-topped arches

Towers, usually round or square

Colonial Revival, 1880—1955

Post Commander's House,
Fort Lewis, Washington

Duplex
Fort Lawton, Washington

Multi-unit Family Housing
Marine Corps Base Quantico, Virginia

Character-defining Features:

Hipped or gabled roof

Symmetrical or asymmetrical

2-stories, sometimes 1-story, with a 1-story side wing

Central entry door

Paneled door with decorative crown supported by pilasters or columns

Fanlights and sidelights

Double-hung windows with multi-pane glazing in one or both sashes

Paired windows

Accentuated front entry sometimes with full-width porch or small portico

Georgian Revival (subtype of Colonial Revival)

Former Headquarters
Fort Lewis, Washington

Administration Building
F.E. Warren Air Force Base, Wyoming

Character-defining Features:

Hipped or gable roof

Symmetrical

Projecting central pavilion

Double-hung windows, usually with multi-pane glazing

Central door, usually pedimented

Dormers

Classical details such as belt course, quoins and dentil cornices

Decorative details such as garlands and swags

Dutch Colonial Revival (subtype of Colonial Revival)

Quarters
Langley Air Force Base, Virginia

Character-defining Features:

Gambrel roof

Symmetrical

2-stories or 1-story

Shed dormer

Entry portico or porch

Double- hung windows, usually with multi-pane glazing

Neoclassical Revival, 1895—1950

Commander's House, F.E. Warren Air Force Base, Wyoming

Pound Hall, Navy Supply Corps School, Georgia
Photo courtesy of the Department of the Navy

Upton Hall, Carlisle Barracks, Pennsylvania
Photo courtesy of Carlisle Barracks

Character-defining Features:

Gabled or hipped roofs

Symmetrical

2-stories, rarely 1-story

Central door, paneled or half-glazed

Double-hung windows usually with multi-pane glazing for the top sash and a single pane bottom sash

Pedimented windows

Façade dominated by full-height porch with classical columns

Ionic or Corinthian columns

Cornice with boxed eaves sometimes with dentils or modillions beneath and a wide frieze

Side and wing porches

Roof balustrade

Tudor Revival, 1890—1940

Officer Quarters
Langley Air Force Base, Virginia

Quarters
Naval Station Bremerton, Washington

Character-defining Features:

Steeply pitched roof, side-gabled or hipped, often asymmetrical

Façade dominated by cross-gables

Tall, narrow windows in pairs or groupings

Double-hung or casement windows

Half-timbering

Massive chimneys, sometimes with decorative chimney pots

Gable dormers

Patterned stonework or brickwork

Use of multiple materials

Entry porticos

Chateauesque (1880—1910) and French Eclectic (1915—1945)

Officer Quarters
Maxwell-Gunter Air Force Base, Alabama

1932 historic photo of Officer quarters
Barksdale Air Force Base, Louisiana
National Archives, 342-FH Box 3B-16032 Barksdale Field LA
NCO Quarters, Box 1055

1932 historic photo of fire station
Barksdale Air Force Base, Louisiana
National Archives, 342-FH Box 3B-16057 Barksdale Field LA
Fire Station, Box 1055

Character-defining Features:

Symmetrical or asymmetrical

Hipped roof, usually steeply-pitched

2-stories, usually

Complex roof-line with vertical elements such as spires, turrets, gables, shaped chimneys, etc.)

Multiple dormers

Masonry walls—brick, stone or stucco

Casement and double-hung windows

Hooded windows

Balconies or towers

Flared eaves, usually

Dormers—arched, circular, hipped or gabled

Half-timbering

Massive chimneys

Beaux-Arts (1885—1930) and Classical Revival (1900—1920)

Admiral's Quarters (Beaux-Arts)
Naval Station Bremerton, Washington

Winnie Davis Hall (Classical Revival)
Navy Supply Corps School, Georgia
Courtesy of the Department of the Navy

Gift Chapel (Classical Revival)
Fort Sam Houston, Texas
Photo courtesy of ERDC-CERL

Character-defining Features:

2+ stories

Flat, hipped or mansard roof

Symmetrical

Masonry walls

Decorative details—quoins, pilasters or columns

Decorative garlands, floral patterns and shields

First story usually rusticated

Pedimented and bracketed windows

Roof balustrade

Accentuated cornice

Spanish Colonial Revival, late 19th century and early 20th century

Mission Revival (1890-1920); Spanish Eclectic (1915-1940); Monterey (1925-1955); and Pueblo Revival (1910-present)

Administration Building (Spanish Colonial Revival)
Randolph Air Force Base, Texas

Chapel (Mission Revival), Randolph Air Force Base, Texas

Non-commissioned Officer Quarters (Spanish Eclectic)
Fort Bragg, North Carolina, Photo courtesy of Fort Bragg CRMP

Character-defining Features:

Symmetrical or asymmetrical

Gabled, hipped or flat roof

Multi-level roofs

Overhanging eaves, wide or little

Stucco wall surface

Usually red tile (barrel or flat) roof covering

Mission shaped dormer or roof parapet

Towers, round or square

Quatrefoil window

Arcaded entry porch

Arches above windows and doors

Balconies, open or roofed

Decorative tiles

Prairie, 1900—1920

Quarters 18, Fort McPherson, Georgia
Photo courtesy of Fort McPherson Cultural Resources Management

Character-defining Features:

Hipped or gabled roof, usually low-pitched

Usually 2-stories

1-story porch or wings

Massive square porch supports

Horizontal patterns in wall materials

Tall casement windows, sometimes with geometric patterns of small-pane window glazing

Horizontal rows of windows

Half-glazed doors

Dormers

Modernistic, early 20th century

Art Moderne (1920-1940); Streamline Moderne (1920-1950); and Art Deco (1920-1940)

Former Dry Cleaners, Fort Bragg, North Carolina
Photo courtesy of Fort Bragg CRMP

Administration Building
Naval Station Bremerton, Washington

Character-defining Features:

Flat roof with ledge or parapet

Asymmetrical

Smooth wall surface, usually stucco

Horizontal grooves, lines and balustrades

Zigzags or other geometric and stylized motifs

Towers or other vertical projections

Curved corners

Windows that turn a corner

Glass-block windows

Steel windows

Round windows

Theater, Fort Belvoir, Virginia

International (1925—present) and Cold War (1946—1989)

Thermo-Con House, Fort Belvoir, Virginia

Vandenberg Hall, United States Air Force Academy, Colorado

Library, Brooks City-Base, Texas

Character-defining Features:

Flat roof, with no ledge or parapet

Asymmetrical

Metal casement windows, set flush with walls

Smooth wall surface

Glass curtain walls

Unornamented, no decorative detailing around doors or windows

Multiple roof levels

Cylindrical forms

Plain round supports for porches

Ribbon or line of windows

Front door not accentuated

Large sections of windowless walls

Cantilevered sections

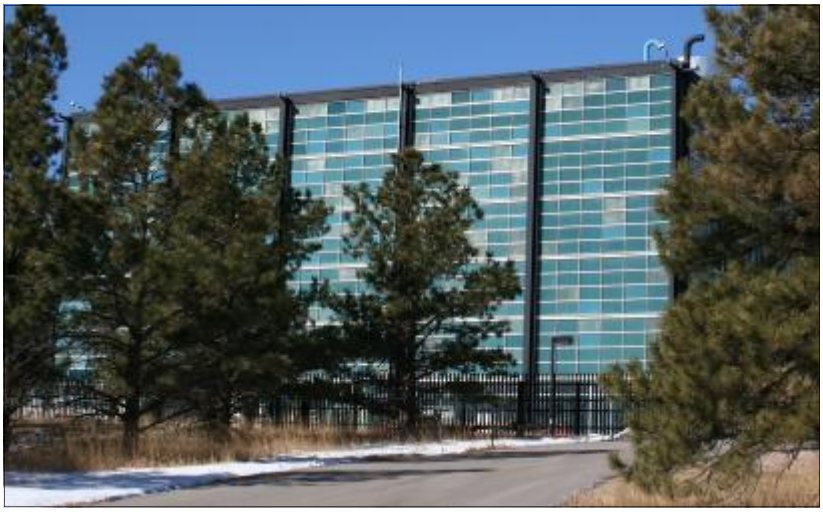
Large windows from floor to ceiling

Barracks, Fort Eustis-Fort Story, Virginia

International (1925—present) and Cold War (1946—1989) (CONTINUED)

Auditorium, Marine Corps Base Quantico, Virginia

Semi-Automatic Ground Environment (SAGE) Building, McGuire Air Force Base, New Jersey



Heating Plant, United States Air Force Academy, Colorado

Mid-Century Modern (1945—1965)

Cadet Chapel, United States Air Force Academy, Colorado

Library, Fort Gordon, Georgia, Photo courtesy of ERDC-CERL

Documentary photo of Kennedy Hall, Fort Bragg, North Carolina
Photo courtesy of the Special Operations Forces Archives

Character-defining Features:

Flat roofs

Glass window and curtain walls

Overhangs above windows

Sliding glass doors

Use of materials such as aluminum, stainless steel, precast concrete, glass and granite or vinyl-asbestos tile

Sculptural building forms (irregular shapes) as well as rectangular

Design of landscape features sur rounding building

Placement of building to provide views of and from

Building Types, various time periods

A majority of military buildings were constructed using standardized plans for specific building types such as hangars, storehouses, stables, mess halls, etc. These buildings may or may not have an associated architectural influence; however; they all have particular character-defining features associated with their building type. For example, some hangars have a unique building form of a multi-story center section with one-story wings. Below are representative examples portraying features that can appear on certain buildings types. The list of features correspond with the photographs of the examples.

Hangars, World War I

Hangar 1
Naval Air Engineering Station Lakehurst, New Jersey
Photo courtesy of NAES Lakehurst
Natural/Cultural Resources Manager

Character-defining Features:

Vertical projection

One-story side wings

Horizontal bands of windows

Large hangar door

Barrel-shaped roof

Stables/Mule barns, 1930s

Field Artillery Mule Barns
Fort Bragg, North Carolina
Photo courtesy of Fort Bragg CRMP

Hay loft door with hayrick above

Exposed rafter ends

2-story front projection

Brick pilasters dividing bays

Horizontal massing

Building Types, various time periods (CONTINUED)

Service Stations, 1937

Service Station
Fort Lewis, Washington

Character-defining Features:

Stone columns

Roof line of porch

Metal windows

World War I Mess Hall, c. 1916 (600 Series)

World War I Mess Hall
Camp Bullis, Texas

Long, rectangular building form

Central door on façade

Ridge vent

Clapboard siding

World War II, Barracks, c. 1940s (700 Series)

World War II Barrack
Fort Rodman, Massachusetts
Library of Congress, HABS MASS, 3-NEBED 27AA

Long, rectangular building form

Side-gabled roof

Aqua media around building

Drop (German) siding

8/8 double-hung wood sash windows

Military Acquired and Vernacular, various time periods

Although some military acquired or vernacular buildings do not have a particular associated architectural influence, they still have character-defining features that can vary from building to building and can include elements from specific architectural influences. Below are representative examples portraying features that can appear on certain military acquired and vernacular buildings. The list of features corresponds with the photographs of the examples.

Residence, 1912 (Military Acquired)

Penrose House at Turkey Creek Ranch, Fort Carson, Colorado

Character-defining Features:

Clay tile roof

Fanlight above doors

Double-leaf entry doors

Engaged porch with simple columns

Use of stucco

Jamestown Exposition Building, 1907 (Military Acquired)

Pennsylvania Building, Naval Base Norfolk, Virginia
Photo courtesy of the Department of the Navy

Multiple fanlights over door

Tower with classical details such as dentil molding and pilasters

Paneled doors

12 over 12 double-hung windows

Parapet wall

Quoins

Use of brick

Military Acquired and Vernacular, various time periods (CONTINUED)

Church, c. 1847 (Vernacular)

Longstreet Presbyterian Church
Fort Bragg, North Carolina
Photo courtesy of Fort Bragg CRMP

Character-defining Features:

Hipped roof

Rectangular form

Full-height columns

Full-width porch

Double-leaf entry doors with transoms

Palladian window

Flush board on façade

Use of pine

Store, 1925 (Vernacular)

Glisson's Store
Fort Stewart, Georgia

Rectangular building form

Roof parapet

Porch with slender porch supports and concrete bases

Use of brick and concrete

SECTION II. DESIGN STANDARDS AND GUIDELINES

Chapter

5. DESIGN STANDARDS

6. DESIGN GUIDELINES—SITE AND SETTING

7. DESIGN GUIDELINES—CHANGES TO BUILDING EXTERIOR

8. DESIGN GUIDELINES—CHANGES TO BUILDING INTERIOR

9. DESIGN GUIDELINES—ADDITIONS AND NEW CONSTRUCTION

10. DESIGN GUIDELINES—ADDITIONAL GUIDELINES

11. DESIGN GUIDELINES—DEMOLITION AND RELOCATION

Aerial view of Fort Monroe, Virginia.
Photo courtesy of the Department of Defense

Building 100, "Taj Mahal"
Randolph Air Force Base, Texas

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5.1 Secretary of the Interior's Standards for the Treatment of Historic Properties

The NHPA of 1966 delegated the United States Department of Interior as the agency responsible for administering the nation's preservation policy including the advisement of federal agencies on the treatment of historic properties. In order to facilitate the preservation process, in the 1970s the Secretary of the Interior developed the *Standards for the Treatment of Historic Properties* (Standards). The Standards have been revised several times over the years (most recent revision in 1990) as part of the Department of Interior regulations for Historic Preservation Certifications (36 CFR Part 68).

The Standards were developed to provide guidance for the appropriate treatment of historic properties (those listed on or eligible for listing in the NRHP) to assist in the long term preservation of a property's significance. They pertain specifically to a property's historic materials and features including all types of materials, construction, size and occupancy. In addition, the Standards encompass the exterior and interior of a building as well as related landscape features, the building's site and environment, and attached, adjacent or related new construction. In terms of historic districts, the Standards encompass all features including but not limited to: buildings, structures, objects, landscape features and infrastructure (roads, parking lots, lighting).

There are four appropriate treatment types under the Standards: Preservation, Rehabilitation, Restoration, and Reconstruction. Each treatment is accompanied by specific standards that are described in the following sections of this chapter. The determination of the type of treatment is based on several factors, such as the property's relative importance to history, current physical condition, and proposed use.

For the most part, DoD primarily utilizes the treatments of Preservation and Rehabilitation for its historic buildings and districts. The majority of preservation or rehabilitation projects for historic buildings and/or properties located in a historic district on a military installation should follow the appropriate standards for Preservation or Rehabilitation. The other two treatments are alternatives. If either Restoration or Reconstruction are considered appropriate treatments in the future, their associated standards should be the basis for the project in compliance with applicable federal regulations.

5.2 Standards for Preservation

The Secretary of the Interior describes the treatment of Preservation as "the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property."[100] The Standards for Preservation pertain to the protection and stabilization of the property through maintenance and repair of historic materials and features. The extensive replacement or new construction of a feature, as well as new exterior additions, are not appropriate measures for this treatment. However, upgrading of mechanical, electrical, plumbing and other building code requirements are permitted if sensitive to the historic character of the property.

The treatment of Preservation is considered an appropriate treatment if a building retains distinctive historic materials and features without the need of major repair; there is no need to depict a specific period of the building's past; and when additions or alterations are not required. The eight Standards for Preservation are as follows:

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
2. The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color, and texture.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archaeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken. [101]

[100] *National Park Service Standards for Preservation and Guidelines for Preserving Historic Buildings,* National Park Service, on-line, <http://www.nps.gov/history/hps/tps/standguide/preserve/preserve_index.htm> Accessed 20 December 2007.

[101] Ibid.

5.3 Standards for Rehabilitation

The treatment of Rehabilitation is defined as the "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values."[102] Interior and exterior alterations sensible to the historic character of a property are acceptable measures under this treatment.

The treatment of Rehabilitation is considered an appropriate treatment if major repairs or replacement of historic material and features is necessary; when a new use requires alteration to the exterior or interior and/or exterior additions; and when there is no need to depict a specific period of the building's past. The ten Standards for Rehabilitation are as follows:

1. A property will be used as it was historically or be given a new use that requires minimal changes to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archaeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired. [103]

[102] *National Park Service Standards for Preservation and Guidelines for Preserving Historic Buildings,* National Park Service, on-line, <http://www.nps.gov/history/hps/tps/standguide/rehab/rehab_index.htm> Accessed 20 December 2007.
[103] Ibid.

5.4 Standards for Restoration

The treatment of Restoration is "the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period."[104] The Standards for Restoration pertain primarily to the removal of features from other periods in a property's history and the reconstruction of missing features from the restoration period based on documentary and physical evidence. In addition, upgrading of mechanical, electrical, plumbing and other building code requirements are permitted if sensitive to the historic character of the property.

As stated previously, the treatment of Restoration is an alternative treatment for historic buildings and districts on DoD installations. The treatment is usually utilized for pivotal buildings or districts when it is desired to interpret their historical significance and character from a certain time period. If Restoration is determined to be the appropriate treatment, the following ten standards should be followed:

1. A property will be used as it was historically or be given a new use which reflects the property's restoration period.
2. Materials and features from the restoration period will be retained and preserved. The removal of materials or alteration of features, spaces, and spatial relationships that characterize the period will not be undertaken.
3. Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve materials and features from the restoration period will be physically and visually compatible, identifiable upon close inspection, and property documented for future research.
4. Materials, features, spaces, and finishes that characterize other historical periods will be documented prior to their alteration or removal.
5. Distinctive materials, features, finishes and construction techniques, or examples of craftsmanship that characterize the restoration period will be preserved.
6. Deteriorated features from the restoration period will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials.
7. Replacement of missing features from the restoration period will be substantiated by documentary and physical evidence. A false sense of history will not be created by adding conjectural features, features from other properties, or by combing features that never existed together historically.
8. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
9. Archaeological resources affected by a project will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
10. Designs that were never executed historically will not be constructed.[105]

[104] Ibid. <http://www.nps.gov/history/hps/tps/standguide/restore/restore_index.htm>
[105] Ibid.

5.5 Standards for Reconstruction

The treatment of Reconstruction is defined as "the act or process of depicting by means of new construction, the form, features and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location."[106] The standards associated with this treatment pertain to the new construction of features of a historic property supported by documentary and physical evidence.

The treatment of Reconstruction is another alternative treatment for historic buildings and districts on DoD installations. Similar to the treatment of Restoration, this treatment is mostly utilized for pivotal buildings or districts when it is desired to interpret their historical significance and character from a certain time period. If Reconstruction is determined to be the appropriate treatment, the following six standards should be followed:

1. Reconstruction will be used to depict vanished or non-surviving portions of a property when documentary and physical evidence is available to permit accurate reconstruction with minimal conjecture, and such reconstruction is essential to the public understanding of the property.
2. Reconstruction of a landscape, building, structure, or object in its historic location will be preceded by a thorough archaeological investigation to identify and evaluate those features and artifacts which are essential to an accurate reconstruction. If such resources must be disturbed, mitigation measures will be undertaken.
3. Reconstruction will include measures to preserve any remaining historic materials features, and spatial relationships.
4. Reconstruction will be based on the accurate duplication of historic features and elements substantiated by documentary or physical evidence rather than on conjectural designs or the availability of different features from other historic properties. A reconstructed property will re-create the appearance of the non-surviving historic property in materials, design, color and texture.
5. A reconstruction will be clearly identified as a contemporary recreation.
6. Designs that were never executed historically will not be constructed.[107]

[106] Ibid. <http://www.nps.gov/history/hps/tps/standguide/reconstruct/reconstruct_index.htm>
[107] Ibid.

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6.1 Views and Viewsheds

The Potomac River is visible from many points on Fort Belvoir, VA.

The view from a historic building, a long vista across a parade field or along the main axis of a community plan, the ability to see the flight-line, or shipyard from headquarters are all examples of viewshed. A viewshed consists of the views to and from historic buildings and the various internal and exterior views of a historic district that contribute to the overall character of a particular place. This character promotes the aesthetic quality of life for those who work, live and visit adjacent to a historic building or within a historic district. Historic views can interpret the historic context of a historic building and/or district. For instance, the steeple of the Main Post Chapel on Fort Bragg, North Carolina is seen from numerous locations throughout the historic main post area and beyond. It creates a historic point of origin and demonstrates the significance of the chapel to the installation. Furthermore, sometimes the planners, and architects of an installation's community plan utilized views to enhance the importance of specific buildings. For example, "Taj Mahal" at Randolph Air Force Base, Texas is situated in a prime location with clear views to enhance the prominence of the building. In some cases the viewshed of neighboring properties is also important to the installation. Upon exiting Fort Myer, Virginia, the road is framed by Arlington Cemetery, the Washington Monument, and the Lincoln Memorial, all significant views and symbolic of the country's heritage.

In order to protect these views, avoid negative impacts such as new construction and cellular communication towers. If avoidance is not possible, minimize visual impacts through the utilization of existing buildings, landscape and topography to integrate new features into the viewshed as well as the use of new appropriate landscaping or architectural screens to create visual buffers.The guidelines on the following page provide assistance to ensure historic views and viewsheds of historic buildings and districts are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Historic Views and Viewsheds:

- Views of monuments, markers or statuary
- Views of historic streetscapes
- Views of historic or important buildings from various locations on the installation
- Views of important features of a historic building such as towers or steeples
- Views of significant landscapes or landscape features
- Views to and from historic buildings
- Views from within and from the boundaries of a historic district
- Views of adjacent historic properties located outside the boundaries of an installation

Guidelines for Views and Viewsheds

1. Identify, preserve and retain historic views and viewsheds of historic buildings and historic districts including but not limited to: scenic vistas and green or open space

2. Plan new construction adjacent to historic buildings and/or outside, but in close proximity, of the boundaries of a historic district to be compatible with the historic character of the building and/or district in regards to materials, scale, size and design. Do not replicate existing historic buildings to avoid creating a false historical appearance.

3. Plan and locate new features such as cell communication towers, mass notification systems and antennae so that they are not visible or are screened or hidden from a historic building, historic district and/or viewshed.

4. See the remaining sections in this chapter (Community Plans; Landscapes and Features; Circulation Systems and Paving Patterns; Fences and Walls; Piers, Docks and Bulkheads; Monuments, Statuary, Markers, and Public Art; Lighting; and Signage) for assistance with viewshed preservation.

View of historic buildings, notice their prominent location on a hill overlooking the Puget Sound. Fort Lawton, Washington

Equally important is the view from the historic buildings of the Puget Sound. Fort Lawton, Washington

6.2 Community Plans

The community plan is a significant element of an installation's historical development. The majority of installations were constructed based on designs that incorporated the planning concepts of that period. For instance, Fort Benning, Georgia was constructed in the 1920s utilizing the community planning theories of the Beaux-Arts style with grand avenues and strategically located open space to provide vistas. Other installations utilized standardized plans, such as Randolph Air Force Base, Texas and Maxwell Air Force Base, Alabama. These installations were designed according to geometric designs, symbolic arrangement of buildings and functional requirements.

Regardless of how the installation created its community plan, the plan and its features are significant character-defining elements of an installation's historic district(s). The plan includes but is not limited to the following features: the layout of streets, neighborhoods and buildings; the relationship of the buildings to significant features like streets, parade grounds and flight lines; the materials of the streets and sidewalks; and the placement of landscape features. The majority of the time, an installation's community plan will be comprised of features from various time periods and construction programs as additional building areas and infrastructure were developed to accommodate changes in an installation's needs and requirements. In these cases, it is important to protect and preserve those features that are significant in portraying the historical development of an installation's community plan.

The community plan should be preserved and protected as part of a historic district to ensure rehabilitations, new construction and other treatments do not have a negative impact on the historic design of an installation. The guidelines on the following page provide assistance for the protection and preservation of historic community plans. For additional guidance, consult your installation's protocol and your SHPO.

Central axes and symmetry play vital roles in the design of community plans and should be protected and preserved. Randolph Air Force Base, Texas

Examples of Community Plan Features:

- Layout of streets, alleyways, sidewalks and bridges
- Designed landscapes such as parade fields, polo fields, parks, and courtyards
- Designed landscapes in response to natural features such as hills and rivers for strategic, defensive or mission-specific activities.
- Streetscapes and street furniture
- Building areas and neighborhoods
- Placement of buildings
- Materials of streets and sidewalks
- Natural landscape features such as open space, hills, rivers, and creeks
- Monuments, statuary and markers
- Ditches, trenches

Guidelines for Community Plans

1. Identify, preserve and retain the historic community plan of historic districts including but not limited to cultural or man-made features such as circulation systems, streetscapes and furnishings, designed landscapes, and monuments and statues, as well as the natural features such as open space, wooded areas, rivers and landforms.

2. Protect, maintain and repair historic man-made and landscape features through appropriate preservation methods. For historic plantings, repair by rejuvenating through appropriate conservation methods such as corrective pruning and aerating soil.

3. If a portion of a historic man-made feature is deteriorated beyond repair, it is appropriate to replace in-kind only the deteriorated portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of an entire historic man-made or landscape feature is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the structure itself. Use only compatible substitute materials if the original material is not available or not environmentally feasible.

5. If replacement of historic plantings is necessary, replace in-kind with the identical species; however, when use of the identical species is not practical due to availability, not disease resistant or for environmental reasons use a similar species that will provide a similar appearance such as in form, color, texture, bloom, fruit, fragrance and scale. Maintain its location and relationship to the historic landscape, building and/or district.

6. It is inappropriate to remove a feature(s) of a historic community plan.

7. Design and locate new features, such as buildings, streets, parking areas, street furniture and monuments, to be compatible with the historic community plan and character of the historic district in terms of scale, size, design and materials.

8. See the other sections of this chapter for further guidance related to historic community plans.

6.3 Landscapes and Features

The parade field at Fort Lewis, Washington is a designed landscape that frames a view of Mount Rainer.

Along with historic buildings, military installations have historic landscapes that are significant to the historic development and character of an installation. Historic landscapes are also referred to as cultural landscapes, which are defined by the National Park Service, as geographic areas associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values.[108] The National Park Service divides cultural landscapes into three main types which are defined as follows:

1. Ethnographic landscape is defined as a landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Ethnographic landscapes include sacred religious sites, ceremonial grounds and massive geological structures. Additionally ethnographic landscapes include traditional cultural properties (TCP), which are those properties "associated with cultural practices or beliefs of a living community that are rooted in the community's historic or are important in maintaining the continuing cultural identity of the community."[109]
2. Historic designed landscape is defined as a landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, engineer, or horticulturist according to design principles, or an amateur gardener working in a recognized style or tradition. Historic designed landscapes include cemeteries, parks, campuses and estates.
3. Historic vernacular landscape is defined as a landscape that evolved through use by people whose activities or occupancy shaped it. Historic vernacular landscapes include rural historic districts and farm complexes.[110]

[108] *The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes,* ed. Charles A. Birnbaum and Christine Capella Peters, Department of Interior, National Park Service, 1996: 4-5.

[109] Patricia L. Parker and Thomas F. King, *National Register Bulletin, Guidelines for Evaluating and Documenting Traditional Cultural Properties*, (Department of Interior, National Park Service: 1998), 1.

[110] *The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes, 4-5.*

The vast majority of military installations probably have either historic designed landscapes or vernacular landscapes as part of their installation's community plan as well as the surroundings for important buildings. For instance, the open green spaces for housing areas or parade fields are historic designed landscapes, as they were created by architects or engineers as part of an installation's community plan.

The majority of the time, cultural landscapes will be comprised of character-defining features from various eras of development and in these cases, it is important to protect and preserve those features that are significant in portraying the historical development of an installation. Character-defining features of landscapes include spatial organization and land patterns, vegetation, topography, circulation features, water features and structures, site furnishings and objects. The guidelines on the following page provide assistance to ensure the protection and preservation of historic landscapes and their features. For additional guidance, consult your installation's protocol and your SHPO.

Mature trees can enhance the streetscape. Maxwell AFB, Alabama

Examples of Spatial Organization and Land Pattern Features:

- Fences, walls, hedgerows
- Patterns, size and proportion of spaces
- Water features
- Topography features
- Agricultural fields, forests
- Parks, playing fields (baseball, soccer, football), and other open spaces

Examples of Vegetation Features:

- Individual plants such as trees, shrubs and ground covers
- Groupings of plants such as woodlands, forests, planting beds, gardens

Examples of Topography Features:

- Terraces
- Hills
- Berms
- Bluffs
- Trenches or Ditches

Guidelines for Landscapes and Features

1. Identify, preserve and retain features of historic landscapes including but not limited to: the relationship and spatial arrangement of the various components of the landscape, water features, circulation patterns, topography, vegetation, structures, site furnishings and objects.

2. It is inappropriate to alter topography through grading, filling or excavating.

3. Protect and preserve historic plant material through appropriate preservation methods including but not limited to the following: use non-destructive methods; daily, seasonal and cyclical tasks such as mowing vegetative cover, plant propagation, and rejuvenating through corrective pruning.

4. Protect and preserve historic landscape features including but not limited to: fountains, sculpture, site and street furnishings, monuments and gravestones, walkways, sidewalks, fences and walls, and hills, trenches and terraces through appropriate preservation methods.

5. If replacement of historic plantings is necessary, replace in-kind with the identical species; however, when use of the identical species is not practical due to availability or for environmental reasons use a similar species that will provide a similar appearance such as in form, color, texture, bloom, fruit, fragrance and scale. Maintain its location and relationship to the historic landscape, building and/or district.

6. If a portion of a historic landscape feature is deteriorated beyond repair, it is appropriate to replace in-kind only the damaged portion using materials that match the original in design, size, scale, material, texture and craftsmanship.

7. If replacement of an entire historic landscape feature is necessary or a feature is missing, replace in-kind matching the original in material, design, size, scale, texture and craftsmanship based on documentary or physical evidence or with a new design compatible to the character of the historic landscape, building and/or district. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the building or structure itself.

8. If new plantings are introduced into a historic landscape they should be compatible with the character of a historic landscape, building and/or district in regards to design, texture, size, scale, material and craftsmanship. Ensure the placement of the new landscaping or feature does not cause damage or is intrusive to the original design intent or to a historic landscape, building, district and/or archaeological site.

9. It is inappropriate to remove, obscure or conceal a historic landscape feature. Where possible, it is appropriate to remove non-significant features that have detracted from or have altered the historic landscape.

10. It is inappropriate to introduce new landscape features, where none ever existed, to create a false historical appearance.

11. See the other sections of this chapter (Views and Viewsheds; Community Plans; Circulation Systems and Paving Patterns; Fences and Walls; Piers, Docks and Bulkheads; Monuments, Statuary, Markers, and Public Art; Lighting; and Signage) for further guidance related to historic landscapes and their features.

This historic gazebo is an important element in the historic district at Fort Leavenworth, Kansas.
Photo courtesy of Fort Leavenworth Directorate of Logistics/ Public Works Files

A fountain is a type of site furniture that can contributes to a historic landscape. Randolph Air Force Base, Texas

Examples of Site Furnishing Features:

- Bridges
- Gazebos
- Playground equipment
- Recreational structures such as spectator stands, goal posts, etc.
- Monuments, statuary, markers and gravestones
- Benches
- Lighting

Examples of Circulation Features:

- Walkways, paths, sidewalks
- Transportation corridors such as railroads, canals, highways, and streets

Examples of Water Features:

- Retention ponds
- Lakes
- Pools
- Streams and creeks
- Rivers, sounds and bays
- Canals
- Fountains

6.4 Circulation Systems and Paving Patterns

The circulation systems and paving patterns within a historic district and the location of a historic building(s) contribute to the overall character of the district and/or building. Circulation systems and paving patterns are the networks of streets, sidewalks, alleyways, driveways and bridges that connect the historic building with their sites or to the larger historic district. The layout, surface material, spacing or rhythm, dimensions and design create a visual effect that add to the historic character of a building and/or district. For example, most installations utilize alleyways in their historic housing areas. The placement of these alleyways and their design creates a unique pattern of geometric shapes and aids in the development of open space or courtyards for houses as well as clean and uniform streetscapes. Historic paving patterns should be protected and preserved during construction projects to ensure the visual character of a historic building and/or district is retained.

This 1920 aerial of Langley Air Force Base, Virginia illustrates early circulation systems. Photo courtesy of the Department of the Air Force

New circulation routes and paving patterns, including the extension or expansion of streets and the development of parking lots, should be compatible with the visual and historic character of a building and/or district. New parking lots should be sited in the same location as seen within the historic district. For instance, if parking lots were traditionally located in the rear of buildings in a historic district, parking lots for new buildings in the district should also be located in the rear. Furthermore, appropriate landscaping can be utilized to soften the view of parking lots. The guidelines on the following page provide assistance to ensure the protection and preservation of historic circulation and paving patterns as well as ensure new designs are congruous with the character of the historic building and/or district. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Circulation Systems and Paving Pattern Features:

- Layout of streets
- Surface materials
- Location and rhythm of control joints and expansion joins in concrete walks
- Layout of brick in a walk (ex. Herringbone)
- Placement
- Spacing or rhythm of driveways, sidewalks, and curb cuts
- Dimension of streets, alleyways, driveways, and sidewalks
- Designed patterns in surface materials
- Landscaped areas such as

Guidelines for Circulation Systems and Paving Patterns

1. Identify, preserve and retain historic circulation and paving patterns including but not limited to: streets, sidewalks, alleyways, driveways, bridges and green space along with their features such as curbing, surface materials, orientation, landscaping and the rhythm, location and pattern of control and expansion joints.

2. Protect, maintain and repair features of historic circulation and paving pattern through appropriate preservation methods during construction projects.

3. Maintain historic planting strips between the sidewalk and street as well as medians. Avoid paving over existing planting strips or medians.

4. If a portion of a historic circulation or paving pattern or feature is deteriorated beyond repair, it is appropriate to replace in-kind only the damaged portion using materials that match the adjacent historic material in design, material, color, texture and craftsmanship.

5. If replacement of an entire historic circulation or paving pattern or feature is necessary, replace in-kind by matching the original in material, design, dimension, setback, color, texture and craftsmanship based on documentary or physical evidence. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the site or structure itself.

6. Design new circulation and paving patterns such as street extensions, new bridges and parking lots to be compatible with the character of a historic building and/or district in regard to design, scale, dimension, color and material.

7. Locate new parking lots in the same location as seen within the historic district and screen with appropriate walls or landscaping in keeping with the character of the historic building and/or district.

8. Locate new parking decks on side streets rather than main thoroughfares if possible and design them to be compatible with the character of the historic building and/or district in regard to design, size, scale, material, color and craftsmanship, or adaptively reuse existing historic buildings.

9. If necessary, introduce street furniture, trash receptacles, mailboxes and other similar elements in locations that do not detract from the character of a historic building and/or district. Make sure street furniture, trash receptacles and other elements are compatible in design, material, scale and color with the character of the building and/or district.

10. It is inappropriate to remove, obscure or conceal a feature of a historic circulation or paving pattern such as granite curbing or stamped curbing when repaving streets.

11. It is inappropriate to remove, obscure or conceal significant landscape or topographical features to construct a new circulation or paving pattern such as a street extension or parking lot.

12. If a street, alleyway or other paving pattern must be permanently closed off from vehicular traffic for security and force protection purposes use bollards or barricades rather than destroying the historic paving pattern by closing it off and destroying the appearance from the street as well as the air. Additionally, use bollards that are compatible with the historic character of the building and/or district. See Section 10. 5 Force Protection for further guidance.

13. It is inappropriate to relocate or demolish a historic building or contributing building in a historic district for the construction of a new circulation or paving pattern including but not limited to: street extensions and parking lots.

14. It is inappropriate to introduce new circulation or paving patterns to create a false historical appearance.

15. If new lighting is necessary, incorporate the lighting in a manner that will not cause a negative impact to the character of a historic building and/or district. See Section 6.8 Lighting for further guidance.

16. For further guidance related to paving patterns see the other sections (Views and Viewsheds; Community Plans; Landscapes and Features; Fences and Walls; Piers, Docks, and Bulkheads; Monuments, Statuary, Markers, and Public Art; Lighting; and Signage) in this chapter as well as Section 7.5 Building Materials.

Examples of Historic Circulation Systems and Paving Patterns

Historic concrete roads enhance the historic character of a district.
Fort Benning, Georgia

Historic bridges provide unique focal points for historic districts.
Naval Station Great Lakes, Illinois

Sidewalks can add to the historic character of a designed streetscape.
Naval Air Station Pensacola, Florida

Historic limestone culverts create architectural interest in historic districts. Fort Leonard Wood, Missouri
Photo courtesy of ERDC-CERL

Alleyways can be important character-defining features of historic neighborhoods.
Fort Benning, Georgia

6.5 Fences and Walls

Historic wall and gate contributes to the historic character of the shipyard at the Naval Air Station Pensacola, Florida

Fences and walls are common features on military installations as they serve both decorative and functional purposes. Historic fences and walls embellish the setting for significant buildings and housing areas as well as help to delineate specific areas. They are constructed with a variety of materials including limestone, brick, iron and wood, and are executed in a variety of patterns and designs. Fences and walls are significant features of the historic setting and character of historic buildings and districts. They should be carefully considered during rehabilitations, new construction and other treatments.

Contemporary fences and walls serve decorative functions but are also constructed to provide security for the users and tenants of buildings as well as controlled access into certain areas. New fences and walls that are necessary to provide privacy and security to building users and tenants should be planned and constructed to compliment the character of the historic setting and be compatible with the character of the historic building and/or district. The guidelines on the following page provide assistance to ensure historic fences and walls are protected and preserved as well as ensure new designs are congruous with the character of the historic building and/or district. For additional guidance, consult your installation's protocol and your SHPO.

Contemporary wall constructed in brick to be compatible with the character of the historic district. Fort Benning, Georgia

Examples of Fences and Walls Features:

- Decorative ironwork
- Patterned masonry
- Latticework
- Guardhouses or accessory buildings
- Guard towers
- Decorative statuary
- Gates
- Stairs
- Columns
- Bollards

Guidelines for Fences and Walls

1. Identify, preserve and retain historic fences and walls and their details, materials and functional and decorative features.

2. Protect, maintain and repair historic fences and walls and their details and features through appropriate preservation methods.

3. If a portion of a historic fence or wall is deteriorated beyond repair, it is appropriate to replace in-kind only the damaged portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of an entire historic fence or wall is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence. Documentary evidence can include historic photographs, original plans and shadow marks or physical evidence. Use only compatible substitute materials if the original material is not available.

5. If a historic fence or wall is missing entirely, replace it with a new fence or wall based on documentary or physical evidence that matches the original in location, material, size, shape, design, scale, color and craftsmanship or a new design compatible with the historic character of the building and/or district.

6. It is inappropriate to conceal historic fence or wall materials with contemporary substitute coatings or materials.

7. Design new fences and walls in a manner that preserves the historic character of the building and/or district in terms of the location, scale, massing and materials and does not block existing views and viewsheds.

8. Chain link fences are inappropriate in historic districts and around historic buildings unless historically appropriate and/or placement is supported by documentary evidence. If it is necessary to enclose a backyard for a pet or for other reasons, consider alternative treatments such as pet portable pens or runs or use fencing with minimal visual impact such as black chain-link when it can be viewed from a historic district.

9. See the other sections of this chapter and Section 7.5 Building Materials and 10.5 Force Protection for further guidance related to fences and walls.

6.6 Piers, Docks and Bulkheads

Piers, docks, bulkheads and other waterfront features are important to military installations located on the water. These features contribute to the history of an installation as well as its historic character. For example, the dry docks, piers, cranes and structures at Puget Sound Naval Shipyard, Washington are significant for their role in repairing ships during World War II. The dry docks at some of our nation's naval shipyards date from the early 19th century and symbolize the maintenance of our Naval Fleet for over two centuries.

Historic piers, docks, bulkheads and other waterfront features should be carefully considered during rehabilitations and new construction to ensure the protection and preservation of the installation's historic waterfront character. In addition, new piers, docks, dry docks and bulkheads should be planned and constructed to avoid a negative impact on the special character of the historic waterfront features. The guidelines on the following page provide assistance to ensure historic piers, docks, bulkheads and other waterfront features are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Bulkheads can be important waterfront features and should be protected and preserved. Norfolk Naval Shipyard, Virginia, Photo courtesy of the Department of the Navy

Examples of Piers, Docks, Bulkhead and Waterfront Features:

- Design
- Materials
- Location
- Pilings
- Mechanical or engineering equipment

Guidelines for Piers, Docks and Bulkheads

1. Identify, preserve and retain historic piers, docks, bulkheads and other waterfront features, and their details, materials and functional and decorative features.

2. Protect, maintain and repair historic piers, docks and bulkheads and other waterfront features, and their details and features through appropriate preservation methods.

3. If a portion of a historic pier, dock, bulkhead or other waterfront feature is deteriorated beyond repair, it is appropriate to replace in-kind only the deteriorated portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of an entire historic pier, dock, bulkhead or other waterfront feature is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the structure itself. Use only compatible substitute materials if the original material is not available.

5. Design new piers, docks, bulkheads or other waterfront features in a manner that preserves the historic character of the structures and/or district in terms of the scale, massing and materials. Additionally, it is inappropriate to obscure historic views or viewsheds towards or from the water. See Section 6.1 Views and Viewsheds for additional information.

6. See the other sections of this chapter (Views and Viewsheds; Community Plans; Landscapes and Features; Circulation Systems and Paving Patterns; Fences and Walls; Monuments, Statuary, Markers, and Public Art; Lighting; and Signage) and Section 7.5 Building Materials for further guidance related to piers, docks, bulkheads and other waterfront features.

6.7 Monuments, Statuary, Markers and Public Art

Monuments, statuary, markers and public art serves many purposes on military installations, including the commemoration of military heroes and events, the remembrance of significant historical events, the recognition of contributions of particular people or groups of people and, in general the enhancement of public spaces. Whether a monument, statue, marker or public art is historic or contemporary, they are important elements to an installation. Therefore, historic monuments and other forms of public art should be protected and preserved.

New forms of public art should be compatible with the overall character of a historic building and/or district. Consult your installation's design guidelines or your installation's protocol for further guidance on the proper procedures for the design, text and location of monuments, markers and other forms of public art. The guidelines on the following pages provide assistance for the protection and preservation of historic forms of public art and the design of new public art adjacent to historic buildings and located in historic districts. For additional guidance, consult your installation's protocol and your SHPO.

New compatible monument for the Global War on Terrorism adjacent to a historic building.
Fort Riley, Kansas, Photo courtesy of Fort Riley Public Works, Conservation and Restoration Branch

This plaque marks the site where the first tree was cut in the construction of the Marine Corps Reservation at Quantico.
Marine Corps Base Quantico, Virginia

Examples of Monuments and other forms of Public Art:

- Cannons, tanks, airplanes and other military equipment
- Statues and markers
- Gravestones and other burial markers

Examples of Decorative Features of Monuments:

- Plaques
- Stands or poles
- Foundation bases
- Decorative masonry, woodworking or ironwork
- Landscaping, lighting, and paving and circulation patterns

Guidelines for Monuments, Statuary, Markers and Public Art

1. Identify, preserve and retain historic forms of public art including but not limited to: monuments, statuary, markers and murals.

2. Protect, maintain and repair historic forms of public art through appropriate preservation methods. Consult Section 7.5 Building Materials for further guidance.

3. If a portion of a historic form of public art is deteriorated beyond repair, it is appropriate to replace in-kind only the deteriorated portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of a missing or deteriorated historic form of public art is necessary, replace in-kind by using materials that match the original in appearance, material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the building itself.

5. Design and introduce new contemporary forms of public art that are compatible with the character of a historic building and/or district. When determining compatibility consider the prominence of the art by considering the location, design, material, size, color, finish and scale of the piece of art.

6. New forms of public art should not remove, obscure or conceal historic landscape features, or detract from the architectural details of a historic building or the character of a historic district, or impact archaeological resources.

7. It is inappropriate to remove historic forms of public art.

8. See the other sections of this chapter for further guidance related to forms of public art.

This plaque was placed here in 1955, marking the home where Dwight D. Eisenhower resided while at Fort Lewis, Washington.

6.8 Lighting

Lighting is essential on military installations to illuminate travel lanes, pedestrian walks and buildings for security and public safety purposes. Traditionally, gas lighting and electricity have been used to illuminate communities across the country as early as the late 19th century; therefore, most installations probably had a form of street lighting and/or porch or exterior building lights historically. For future lights on a historic building or in a historic district, use existing historic street lamps, porch lights or exterior building lights as a standard or model. Otherwise, the installation should develop a standard in consultation with the SHPO for the various forms of lighting. The standard should be compatible with the character of the historic building and/or district, and it should maintain uniformity and consistency in scale, color and style. The guidelines on the following page provide assistance to ensure historic lighting is protected and preserved, as well as ensure new designs are congruous with the character of the historic building and/or district. For additional guidance, consult your installation's protocol and your SHPO.

Examples of historic lighting fixtures that add character to a historic building.
Left; Fort Sam Houston, Texas
Right: Randolph Air Force Base, Texas

Historic lamp post (left) and appropriate Replica lamp post (right)
United States Military Academy, New York

Examples of Decorative Features of Lighting:

- Shaft– fluted, plain
- Base—concaved, squared, round, octagonal
- Lantern—fixed, hanging, single, paired
- Glass—textured, clear or colored

Guidelines for Lighting

1. Identify, preserve and retain historic exterior lighting fixtures including but not limited to: street lamps, porch lights and other exterior building lights.

2. Protect, maintain and repair historic exterior lighting fixtures through appropriate preservation methods.

3. If a portion of a historic exterior lighting is deteriorated beyond repair, it is appropriate to replace in-kind only the deteriorated portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of a missing or deteriorated historic exterior lighting fixture is necessary, replace it in-kind using materials that match the original in appearance, material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the building itself.

5. If historic exterior light fixtures do not provide adequate illumination for security and public safety, unobtrusive contemporary lighting fixtures should be used to supplement the existing lighting.

6. Design and introduce new contemporary exterior lighting fixtures that are compatible with the character of a historic building and/or district. When determining compatibility consider the location, design, material, size, color, finish, scale and brightness of the fixture. Ensure the light emitted from the fixtures does not impact the character of the historic building and/or district.

7. It is inappropriate to select or install exterior lighting fixtures that will cause light pollution and impact the character of a historic building and/or district or intrude on adjacent historic properties. For new light fixtures, consider using focused lighting, fully shielded lighting or energy efficient lighting types to minimize light pollution.

8. It is inappropriate to remove historic exterior lighting fixtures.

9. It is inappropriate to introduce lighting fixtures, where none ever existed, to create a false historical appearance of a building and/or district. For example avoid using a Colonial or Williamsburg reproduction from the period of the 1700s in a historic district with a Period of Significance of the 1920s.

10. See the other sections of this chapter for further guidance related to lighting.

6.9 Signage

Signage has traditionally been an integral element of military installations to help identify buildings, housing neighborhoods and other key areas on installations as well as marking a building's number or address and providing directions to visitors. Historic signs, markers or cornerstones should be retained and preserved. Contemporary signage on or near historic buildings and in historic districts is appropriate provided it is compatible with the character of the building and/or district. Most importantly, the signage should not obscure historic architectural details or landscape features of the historic building and/or within a historic district.

Most military installations have developed a standard for signage that includes appropriate colors, style of lettering, size and shape. Consult your installation's design guide or your installation's protocol for the correct specifications for signage. The guidelines on the following page provide general guidance related to signage in addition to your installation's standard to ensure the protection and preservation of historic signs and ensure new signs are congruous with the character of a historic building and/or district. For additional guidance, consult your installation's protocol and your SHPO.

Example of new signage designed to be compatible with the character of a historic building. Marine Corps Recruit Depot, San Diego, California

Examples of Decorative Features of Signage:

- Overall shape and design
- Lettering
- Coloring of background and text
- Stand, arm or mechanism to hold sign

Historic sign welcomes visitors into the park at Fort Monroe, Virginia.

Guidelines for Signage

1. Identify, preserve and retain historic signs, markers and cornerstones that contribute to the character of a historic building and/or district.

2. Protect, maintain and repair historic signs, markers and cornerstones through appropriate preservation methods.

3. If a portion of a historic sign, marker or cornerstone is deteriorated beyond repair, it is appropriate to replace in-kind only the deteriorated portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of a missing or deteriorated historic sign is necessary, replace it in-kind using materials that match the original in appearance, material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the building itself.

5. New signage should be compatible with the character of the historic building and/or district in terms of design, detail, color, material, size and scale.

6. It is inappropriate to obscure or conceal significant architectural or landscape features or large portions of a building's façade with signage, unless doing so is historically accurate.

7. Fasten new signs to a historic building in a manner that will not cause damage to the building or harm significant architectural features. For example, signs on masonry walls should be nailed into the mortar joints. It is preferred to use freestanding signs for historic buildings.

8. Freestanding signs should be located in an area that will not disrupt the existing streetscape of a historic district, or harm a historic landscape feature, or impact archaeological resources.

9. It is inappropriate to paint or apply signs directly onto the surface of a building including but not limited to: glass windows and doors.

10. If lighting is necessary for signage, light in a manner that is compatible with the character of the historic building and/or district. See the previous Section 6.8 Lighting for further guidance.

11. See the other sections of this chapter for further guidance related to signage.

6.10 Archaeological Resources

The vast majority of military installations contain archaeological resources along with historic buildings and districts. These resources are important due to their potential to yield valuable information pertaining to our past. They provide information about the culture, technology and architecture of Native Americans, Alaska Natives, Native Pacific Islanders, settlers and subsequent inhabitants from the pre-historic and historic past. Additionally, archaeological resources provide information related to historic periods, such as the location of former buildings and outbuildings and the additions to an existing property. All of these resources, whether prehistoric or historic, are an integral part of our country's heritage and therefore should be protected and considered during the early stages of planning for new construction projects located in or adjacent to a historic building and/or district.

According to federal laws, DoD regulations and the individual military services' regulations, an individual should not remove any artifact from a potential archaeological site, which includes the ground disturbance of an archaeological site. Prior to any project involving ground disturbance, follow your installation's protocol pertaining to archaeological resources and notify the proper authorities to ensure no disturbance will occur to an archaeological site. The guidelines on the following page are not intended for the management of archaeological resources, but rather to provide assistance for the protection and preservation of archaeological resources during new construction located in or adjacent to historic buildings, structures, sites and districts. Consult your Installation Cultural Resources Manager and your SHPO for information regarding the management of archaeological resources.

Examples of Archaeological Resources:

- Artifacts:
  - Pieces of pottery
  - Points or lithics
  - Antique glass, bottles and beads
  - Chimney and foundation ruins
  - Ship, submarine, and plane wreckage
- Sites:
  - Pre-historic
  - Pre-contact/Proto-historic
  - Contact
  - Historic
  - Underwater

Archaeological excavation can be an important component of cultural resources management.
Fort Bragg, North Carolina
Photo courtesy of Fort Bragg CRMP

Guidelines for Archaeological Resources

1. Protect and preserve archaeological resources in place.

2. Evaluate all potential rehabilitation, construction, utility and other projects for impacts to archaeological resources with the Installation Cultural Resources Manager during the planning phase of the project.

3. If archaeological resources are inadvertently discovered during rehabilitations or new construction, stop further work until the resources can be evaluated. Follow installation procedure for inadvertent discovery.

4. Minimize ground disturbing activities located in or adjacent to a historic buildings and/or districts that could cause damage to archaeological resources. Activities include digging, grading, excavating and infill.

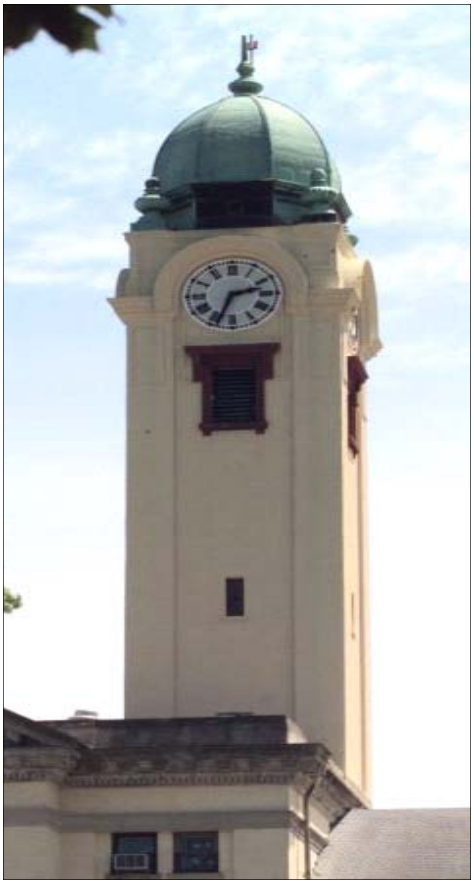
5. Avoid changes to the terrain of a historic area.

6. Avoid using heavy machinery in areas known to have archaeological resources to avoid disturbing archaeological resources.

7. Unauthorized removal of any artifact from an archaeological site is punishable by federal law, DoD regulations and the military services' regulations.

7.1 Roofs and Details

Roofs are important elements of historic buildings as they provide architectural interest as well as long-term protection to the building. Roofs can be flat, gabled, pitched, hipped, curved or a combination of these forms. In addition, roofs can be constructed of various materials including clay tile, metal and wood shingles, slate, standing seam metal and asbestos or asphalt shingles. Roofs, their forms, and features provide character to a historic building and often portray a particular architectural style or influence and a period of construction. For instance, the Tudor Revival style (1890-1940) is depicted by steeply pitched gable roofs whereas classical architectural styles like Greek Revival (1825-1860) and Neoclassical (1895-1950) have low pitched or hipped roofs.



The shape, materials and details are all character-defining features of this bell tower at Fort Leavenworth, Kansas. Photo courtesy of Fort Leavenworth Directorate of Logistics/Public Works Files

Buildings on military installations typically display an array of roof types and forms with various shapes, sizes, materials, color and patterning. The roofs usually contain functional and decorative features including but not limited to: cresting, balustrades, dormers, cupolas, parapets and chimneys. All roof elements of historic buildings are essential to the design and style of the buildings and, therefore, should be carefully considered during rehabilitations or other treatments. The guidelines on the following pages provide assistance to ensure historic roofs and their associated features are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Example of Decorative features of Roofs:

- Cresting
- Balustrades
- Dormers
- Cupolas
- Towers
- Parapet walls
- Chimneys
- Finials
- Vents
- Gutters (built-in and exterior) and downspouts

Steeply-pitched cross gables are characteristic of the Tudor Revival style. Naval Station Bremerton, Washington

Guidelines for Roofs and Details

1. Identify, preserve and retain historic roof and roof forms such as shape, material and patterning. Additionally, retain and preserve their functional and decorative features including but not limited to: cresting, dormers and chimneys.

2. Protect and maintain historic roofing materials and forms through regular maintenance using appropriate preservation methods, including removal of debris from roofs and cleaning and maintenance of gutter systems. It is important to maintain a weather tight roof for the long-term preservation of a historic building.

3. Repair historic roofs and features using accepted preservation methods.

4. If a portion of the historic roof or feature is deteriorated beyond repair, it is appropriate to replace only the damaged portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If full replacement of a deteriorated historic roof or feature is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

6. If a historic roof feature is missing, replace only that feature in-kind based on documentary or physical evidence either matching the original in material, size, shape, design, scale, color and craftsmanship or using a new design that is compatible with the historic character of the building and/or historic district. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the building itself.

7. It is inappropriate to remove historic roof features to ease the maintenance or installation of a new roof. Historic roof features should be preserved and maintained.

8. New gutter systems should be compatible with the historic character of the building and/or historic district and should not damage or conceal architectural features.

9. It is inappropriate to replace concealed, built-in gutter systems with modern exposed gutters.

10. It is inappropriate to apply new features, where none ever existed, to a historic roof to create a false historical appearance. Such features include but not limited to: balustrades, cupolas and cresting.

11. New roof features such as skylights, dormers, vents, solar panels, antennas, satellite dishes and mechanical equipment should not be introduced if they compromise the original roof form, materials, features or overall character of the historic building and/or district. These features, if added, should not be visible from the street.

12. Design necessary additions to roofs such as elevator shafts, stairs, decks and terraces to be compatible with the character of the historic building and/or district and not visible from the street.

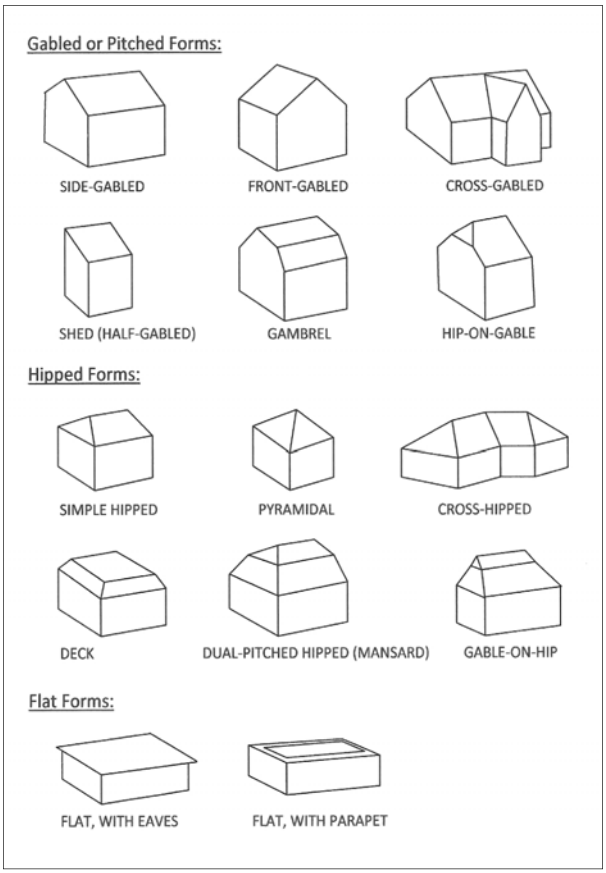
13. It is inappropriate to use temporary measures long term such as exposed tarpaper as a finished roofing material or as valley flashing. In addition, tar or asphalt products should not be used to patch terra cotta clay tiles, slate, wood or metal roofs.

14. See Sections 7.3 Windows and Doors; 7.4 Entrances, Porches and Details; 7.5 Building Materials; 7.6 Decorative Architectural Details; and 10.4 Utilities, Energy Efficiency and Sustainability for further guidance related to roofs and their associated functional and decorative features.

This building depicts a side gable roof with parapet ends.
Fort Hamilton, New York

Example of a historic copper gutter.
Randolph Air Force Base, Texas

Cross-gable roof shape, Fort Belvoir, Virginia

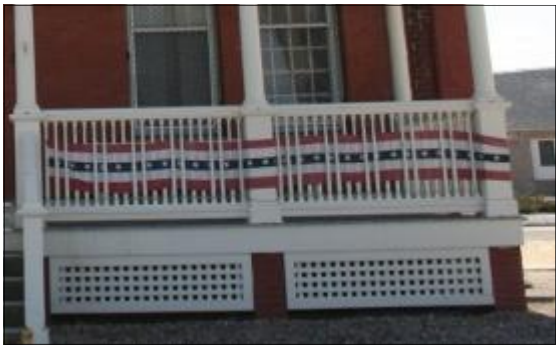


Common Roof Forms
Adapted from Field Guide to American Houses
By Virginia and Lee McAlester

Pyramidal roof shape, former military building
Vancouver Barracks, Washington

Flat (with eaves) roof shape, Fort Belvoir, Virginia

7.2 Foundations and Walls



Example of latticework used to embellish a foundation. F.E. Warren Air Force Base, Wyoming

Foundations and walls are character-defining and essential elements for any historic building. Foundations provide stability for the building and usually contain minimal ornamentation. The materials and design of the foundation can also provide useful information in determining the age of a building. For example, early buildings of the 17th and 18th centuries used dry-laid stone pier or stone foundations depending on geographical location.

Exterior walls also serve in a functional capacity by providing stability to a building and defining the building both vertically and horizontally. Unlike foundations, walls also have a decorative component as they provide stylistic detailing and ornamentation. Walls can contain such features as projecting bays (windows or doors), pediments, towers and turrets that redefine the shape of a wall and provide a building with character. In addition, details like brackets, cornices, entablatures, and quoins further embellish a building architecturally and add to its character. The type of material also contributes to the design of a building by providing patterns, texture, color and scale. Wall materials include wood shingles, clapboard or weatherboard, brick, concrete block, stucco, stone, and various combinations of these materials.

Foundations and exterior walls are important elements of a historic building and therefore should be carefully considered during rehabilitations or other treatments to historic buildings. The guidelines on the following pages provide assistance to ensure foundations and exterior walls and their associated functional and decorative features are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Contrasting building materials can provide architectural interest to walls. Fort Lewis, Washington

Examples of Decorative Features of Foundations and Exterior Walls:

- Windows, various types
- Doors, various types
- Pediments, cornices and entablatures
- Bargeboard or vergeboard
- Towers, turrets
- Brackets
- Quoins
- Patterning of brick or shingles
- Corbelling
- Latticework

Guidelines for Foundations and Walls

1. Identify, preserve and retain historic foundations and exterior walls that contribute to the historic character of a building, including their functional and decorative features such as cornices, bays, piers and pediments.

2. Identify, retain and preserve historic foundation and exterior wall materials.

3. Protect, maintain and repair materials, details and features of foundations and exterior walls through appropriate preservation methods.

4. If a portion of a foundation, exterior wall or feature is deteriorated beyond repair, replace in-kind only the damaged portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If replacement of an entire foundation, exterior wall or feature is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

6. If portion of a foundation, exterior wall or feature on a foundation and wall is missing, replace it by matching the original in material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence or a new design compatible with the character of the building and/or district. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the building itself.

7. It is inappropriate to introduce new features such as windows, doors, and vents to character-defining exterior walls. If new features are required for adaptive use of a historic building, features may be installed only on secondary elevations (rear elevation or elevations not visible from the public right-of-way).

8. It is inappropriate to remove or conceal any historic exterior wall materials or features including but not limited to: panels, pediments, bargeboard and cornices.

9. It is inappropriate to cover any historic exterior wall or foundation materials with modern substitute materials such as vinyl siding or hardi-plank.

10. It is inappropriate to apply features to an exterior wall or foundation, where none ever existed, to create a false historical appearance.

11. See the other sections of this chapter for further guidance.

7.3 Windows and Doors

Windows and doors are character-defining features that contribute to the significance of a building and frequently assist in the identification of the architectural style or influence and the date of construction. Characteristics such as the configuration of the windows and doors, the scale of the openings, light or panel configurations, and decorative features are associated with a specific building type, architectural style or influence, and/or time period.

Military installations have an array of window and door types with a variety of configurations, glazing, materials and decorative features. The guidelines on the following pages provide assistance to ensure historic windows and doors and their associated features are protected and preserved. These guidelines pertain to all window and door types including but not limited to: window walls, skylights, bay windows, clerestory windows, dormer windows, garage and industrial doors and hangar doors. For additional guidance, consult your installation's protocol and your SHPO.

Barrack entrance with original doors and windows. Fort Lewis, Washington

Examples of Decorative Features of Windows and Doors:

- Transoms
- Sidelights
- Fanlights
- Decorative brackets and hoods
- Architectural trim, molding, panels, thresholds and surrounds
- Stained or colored glass, textured glass, beveled glass
- Hardware
- Screens or storm windows and doors
- Shutters
- Awnings

Historic garage doors , Fort Benning, Georgia

Guidelines for Windows and Doors

1. Identify, preserve and retain historic windows and their functional and decorative features including but not limited to the following: frames, sashes, muntins, sills, decorative jambs and moldings, hardware, shutters and detail materials such as stained glass, beveled glass, textured glass or tracery.

2. Identify, preserve and retain historic doors and their functional and decorative features including but not limited to the following: frames, panels, glazing, sidelights, fanlights, surrounds, thresholds, hardware and screen doors.

3. Protect, maintain and repair historic windows and doors in buildings through regular inspections and appropriate maintenance measures such as cleaning using the gentlest means as possible, application of appropriate protective coating, and proper glazing.

4. If a feature of a window or door is severely deteriorated beyond repair, it is appropriate to replace only the damaged portion or feature. Replace the portion or feature with materials similar to the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If an entire window or door is beyond repair or missing, replace with materials that match the original in size, shape, design, scale, color, and craftsmanship. Ensure the replacement window or door duplicates the original size and profile, configuration, architectural trim and other details of the historic window or door. Use only compatible substitute materials if the original material is not available.

6. It is inappropriate to apply new features, where none ever existed, to a historic window or door to create a false historical appearance. Such features include but are not limited to: shutters, awnings, hoods and molding.

7. Awnings can be installed over windows and doors if historically appropriate for the building. The awnings should not obscure or damage the windows, doors, or other character-defining features. Ensure the awnings are similar to the originals in design, profile, style and shape based on physical or documentary evidence. Documentary evidence can include historic photographs, original plans and shadow marks or evidence on the building itself.

8. Storm windows can be installed so that they do not obscure or damage the existing sash or frame. Select storm windows that do not obscure the character defining features of the window. For example, if a window is a double-hung sash, install a storm window with a horizontal divider that matches the location of the window.

9. Full-light storm doors can be installed so that they do not obscure or damage the existing door and frame. Select storm doors compatible with the color and character of the existing door.

10. If new windows or door openings are required for adaptive use of a historic building, they should be installed only on secondary elevations (rear elevation or elevations not visible from the public right-of-way). The new windows should be compatible with, but not duplicate, the building's historic windows and fenestration to avoid creating a false historical appearance.

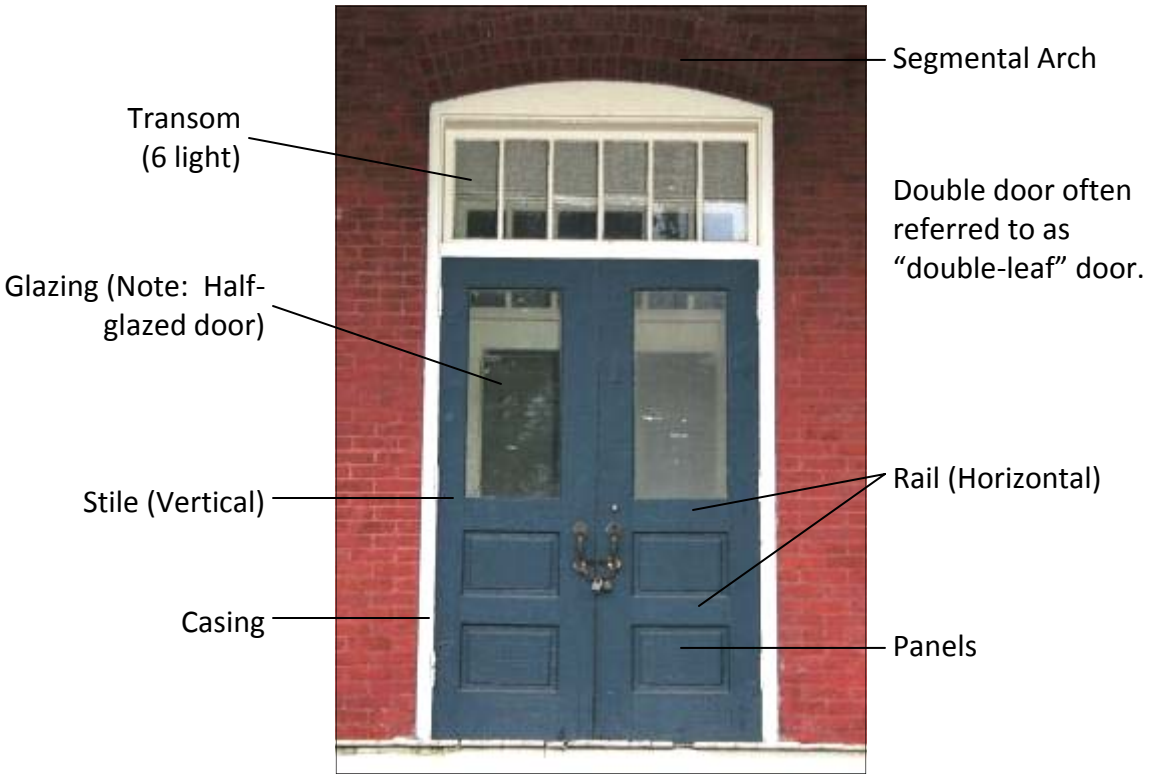
11. Windows or doors that have to be covered from the inside for security and other purposes should be locked, cleaned, and covered with sheetrock on the exterior or interior rather than infilled with a permanent material such as brick or concrete.

12. See Sections 7.2 Foundations and Wall; 7.5 Building Materials; 7.6 Decorative Architectural Details; 7.7 Exterior Paint, Coatings and Color; 10.4 Utilities, Energy Efficiency and Sustainability; and 10.5 Force Protection for further guidance on windows and doors of historic buildings.

Example of a replacement window that accurately matches the original.
Randolph Air Force Base, Texas

These stained glass windows are significant under the Army's Cold War Context. JFK Chapel, Fort Bragg, North Carolina
Photo courtesy of ERDC-CERL

Basic Door and Window Terminology



Original half-glazed, double-leaf door with transom.

Original 6 over 6 double-hung wood sash window with a three-light transom.

7.4 Entrances, Porches and Details

Entrances accent the façades of historic buildings. Maxwell Air Force Base, Alabama

Entrances and porches serve a multitude of purposes for buildings, such as outdoor access, additional living space, sleeping quarters and ceremonial space. Although they are primarily functional in nature, entrances and porches also provide highly visible opportunities for decorative features and embellishment of a building. Entrances, porches and their functional and decorative features can be essential in defining the overall character of a building as well as determining its architectural style or influence and period of construction. For example, Greek Revival buildings (early 19th century) are usually defined by an entrance adorned with columns and a pediment and Art Deco (1920s- 1940) is defined with entrances of stylized glass and vertical projections.

Entrances and porches on the main elevation of a building are significant, but side and rear entrances and porches are as important. For instance, Army barracks constructed during the 1920s and 1930s featured rear porches for access and ventilation. Although these porches are on the rear elevation, they still contribute to the overall character of the building. Entrances and porches, regardless of their location on the building, are character-defining features and should be carefully considered during rehabilitations or other treatments to historic buildings. The guidelines on the following page provide assistance to ensure entrances, porches and their associated features are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Decorative Features of Entrances and Porches:

- Columns and pilasters
- Horizontal or vertical projections
- Balustrades
- Trim
- Railings
- Steps/Stairs
- Floor and ceiling
- Porch posts or piers
- Doors and features
- Roofs

Rear porches of 1920s Army barracks. Fort Lewis, Washington

Guidelines for Entrances, Porches and Details

1. Identify, preserve and retain historic entrances, porches and their functional and decorative features including but not limited to: columns, pilasters, piers, entablatures, sidelights, transoms, steps/stairs, railings, floors and ceilings.

2. Protect, maintain and repair historic entrances, porches and their materials through appropriate preservation methods.

3. If a portion of an entrance, porch or feature is deteriorated beyond repair, replace in-kind only the damaged portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of an entire entrance, porch or feature is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If an entrance, porch or feature is missing, replace it by matching the original in material, size, shape, design, scale, color, and craftsmanship based on documentary or physical evidence or using a new design compatible with the character of the building and/or historic district. Documentary evidence can include original plans, historic photographs or shadow lines or evidence on the building.

6. It is inappropriate to enclose a historic front or primary entrance or porch. If enclosure of a historic entrance or porch on a secondary elevation is necessary for the adaptive use of a building, design the enclosure to preserve the historic character of the entrance or porch, building and district. For instance, recess the enclosure behind columns, balustrades and other features and/or consider using glass instead of solid materials.

7. It is inappropriate to remove any feature and materials associated with entrances and porches including but not limited to: beaded board, railings and spindlework.

8. It is inappropriate to remove an original entrance or porch. If the entrance or porch is no longer functional, leave it intact.

9. It is inappropriate to add a new entrance or porch to a primary elevation (front façade or elevation visible from the street).

10. If additional entrances or porches are necessary, design in a manner that preserves the historic character of the building and/or historic district and limit the alteration to secondary elevations (rear elevation or elevations not visible from the public right-of-way). Consult Section 9.1 Additions to Historic Buildings for further guidance.

11. It is inappropriate to apply new features, where none ever existed, to an entrance or porch to create a false historical appearance. Such features include but not limited to: balustrades, pediments and columns.

12. See Sections 7.1 Roofs and Details; 7.2 Foundations and Walls; 7.3 Windows and Doors; 7.5 Building Materials; 7.6 Decorative Architectural Details; and 10.5 Force Protection for further guidance related to entrances and porches.

An elaborate entrance adorned by arches with a classical pediment.
Infantry Hall, Fort Benning, Georgia

An entrance accented by paired columns and ornate door surround.
Vancouver Barracks, Washington

A simple entrance with a roof supported by brackets.
Fort Lewis, Washington

Basic Porch and Detail Terminology

A typical classical-style entry porch.

7.5 Building Materials

Building materials are essential elements to any historic building and/or district since they add another dimension to a building's historic character. Each building material is associated with various traits that help to characterize a building's architectural style or influence and period of construction. For instance, textured and pattern wood shingles used to cover exterior walls portray the delicate and whimsical charm associated with the Queen Anne style (1880-1910). Building materials can also help to identify a building's region. For example, the majority of buildings constructed at the United States Military Academy (USMA) at West Point, New York (regardless of the architectural style or time period) were built utilizing the available local resource of granite. Therefore, the buildings at USMA have a unique character that is partially due to their granite construction.

Granite construction gives buildings at USMA a unique appearance.
United States Military Academy, New York

Compatible Substitute Building Materials

Building materials are character-defining features of historic buildings, and therefore, when features are deteriorated, damaged or missing, it is best to repair or replace with historic materials. However, some circumstances warrant the consideration of the use of compatible substitute materials including: 1) unavailability of historic materials; 2) unavailability of skilled craftsmen; 3) inherent flaws in the original materials; and 4) building code-required changes. In these circumstances, substitute materials are acceptable to be used on historic buildings on a limited basis in consultation with the SHPO and/or following your installation protocol. Additionally, not every substitute material is considered acceptable and compatible for historic buildings. According to the National Park Service, substitute materials must meet three basic criteria: 1) compatible with the historic material in appearance; 2) their physical properties must be similar to those of the historic material or be installed in a manner that tolerates differences; and 3) they must meet certain basic performance expectations over an extended period of time. For further guidance on the use of substitute materials on historic buildings, please consult the National Park Service's Preservation Brief 16 titled, *The Use of Substitute Materials on Historic Building Exteriors* and your SHPO.

The majority of the historic building materials on military installations can be classified into three categories – Wood, Masonry and Architectural Metals. This section of the design guidelines is divided into those three categories in order to provide specific guidelines for each type of building material. If your installation has a historic building material that does not fit into the three categories mentioned above it is recommended to follow the general guidelines listed below:

1. Identify, preserve and retain historic building materials.

2. Protect, maintain and repair historic building materials through appropriate preservation methods.

3. Repair historic building materials; if a portion of a historic building material is deteriorated beyond repair, replace only the damaged portion matching the original in regard to material, size, shape, design, scale, color, texture and profile.

4. If replacement of an entire feature is necessary or if a feature is missing, replace only that feature in-kind matching the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. See the other chapters of this section for further guidance related to building materials.

For additional guidance, consult your installation's protocol and your SHPO.

This building utilizes masonry and wood building materials creating a pleasing visual effect. Fort Monroe, Virginia

7.5.1 Wood

Wood is used as a building material to include siding and decorative details and features. It is frequently an important component of historic buildings as structural mem-bers, exterior cladding, roofing, and decorative features. Wood has been used for the construction of buildings for every architectural influence, time period and geographical region. Additionally, wood is utilized for site and landscape features in historic districts including fences and signs.

Various types of wood have been used to construct and finish the exterior of historic buildings. Historically, wood choices were dictated by geographical region and may have included cedar, Douglas fir, hemlock, pine, redwood and spruce. Each type of wood has its own unique structural capacity, ability to withstand deterioration, and reaction to types of coatings and finishes. Therefore, each project involving wood should be considered individually based on the type of wood utilized in the historic building. The following guidelines provide assistance to ensure building and landscape elements constructed of wood are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Wood Features:

- Cornices and entablatures
- Columns and porch Posts
- Shutters
- Trim, molding, brackets, and bargeboard
- Shingles (roof and wall)
- Fences

Intricate wood details add character to a historic building. Fort Sam Houston, Texas

Wood was used for all types of architectural details including cornices, dentil moldings, columns and pediments. F.E. Warren Air Force Base, Wyoming

Guidelines for Wood

1. Identify, preserve and retain historic wooden building and landscape features including but not limited to: siding, shingles, and architectural details such as cornices, balustrades, moldings and their paints and finishes.

2. Protect, maintain and repair wooden surfaces and features through appropriate preservation methods.

3. If replacement of a deteriorated detail of a wooden surface or feature is necessary only replace the damaged portion. Replace in-kind matching the original detail in material, size, shape, design, scale, color and craftsmanship.

4. If replacement of an entire detail of a wooden surface or feature is necessary, replace in-kind by matching the original detail in material, size, shape, design, scale, color and craftsmanship.

5. If a wooden surface or feature is completely missing, replace it with a new feature based on documentary or physical evidence either by matching the original in material, size, shape, design, scale, color, and craftsmanship or using a new design compatible with the character of the building and/or historic district. Documentary evidence can include historic plans, photographs and shadow marks or evidence on the building or structure itself.

6. Maintain a sound paint film on all previously painted wooden surfaces. Maintain stained wood surfaces with stain. Avoid painting historically stained wooden features or stripping historically painted wooden surfaces and features down to the bare wood and applying clear stains or finishes to create a natural wood appearance. (CAUTION: Consult with the appropriate Hazardous Materials personnel for guidance on paint containing lead.)

7. It is inappropriate to clean wooden surfaces and features with abrasive methods such as sandblasting, high pressure water blasting, power washing, high heat and open flame, or using propane or butane torches.

8. It is inappropriate to replace or cover wooden siding, trim, window sashes and other architectural details with contemporary synthetic materials such as vinyl, aluminum, masonite, hardiplank or hardiboard, and asphalt.

9. It is inappropriate to apply new wooden features, where none ever existed, to a building to create a false historical appearance.

10. See the other sections of this chapter for further guidance related to wood surfaces.

7.5.2 Masonry

Masonry building materials include the following: brick, terra-cotta, stone, stucco, slate, concrete and mortar. Masonry building materials vary in size, shape, finish and mortar, which affect the appearance of historic buildings and contribute to the character of the building. Additionally, masonry building materials are utilized for site and landscape features in historic districts such as roads, curbing, driveways, steps, and sidewalks. The following guidelines provide assistance to ensure building and landscape elements constructed of masonry are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Terra cotta and brick create architectural interest for this building. Naval Station Great Lakes, Illinois

A stone carved handrail adds character to the historic building. Randolph Air Force Base, Texas

Example of Masonry Features:

- Roofing material
- Exterior wall material
- Foundations
- Terra cotta decorative panels
- Window hoods and lintels
- Arches
- Cornices
- String courses
- Quoins
- Roads
- Curbing
- Driveways and alleyways
- Monuments and statuary
- Walls

Guidelines for Masonry

1. Identify, preserve and retain historic masonry building and landscape features including but not limited to: walls, foundations, roofing materials, chimneys and landscape features.

2. Protect, maintain and repair masonry surfaces and features through appropriate preservation methods.

3. If replacement of a deteriorated detail of a masonry surface or feature is necessary only replace the damaged portion. Replace in-kind matching the original detail in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of a masonry surface or feature is necessary, replace in-kind by matching the original detail in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If a masonry surface or feature is completely missing, replace it with new material based on documentary or physical evidence either by matching the original in material, size, shape, design, scale, color and craftsmanship or using a new design compatible with the character of the building and/or historic district.

6. Repoint masonry mortar joints if the mortar is cracked, crumbling or missing. Replace the mortar in-kind with a new mortar that is similar to the original in strength, color, texture, and composition and matches the original mortar joints in width and profile.

7. Avoid painting unpainted masonry surfaces that were not painted historically or removing paint from historically painted surfaces. It is appropriate to repaint previously painted masonry surfaces and features in colors that are compatible for the historic building and/or district

8. It is inappropriate to clean masonry surfaces and features with abrasive methods such as sandblasting, water blasting and power washing.

9. It is inappropriate to apply new masonry features, where none ever existed, to a building to create a false historical appearance. Such features include but not limited to: chimneys, piers and arches.

10. See the other sections of this chapter for further guidance related to masonry surfaces and features.

7.5.3 Architectural Metals

Architectural metals include cast iron, stainless steel, steel, pressed tin, copper, aluminum, bronze, lead, zinc and other types of metals. Architectural metals encompass a wide range of building elements ranging from details to entire buildings. They are commonly used for roofing and gutter systems such as standing-seam roofs and flashing, and gutters and downspouts. Additionally, they are utilized for architectural details including but not limited to: cresting, grates, cornices, finials, railings, trim work, hardware and windows and doors. Historically, entire buildings or building types have been made of metal like Quonset Huts. Site and landscape features in historic districts can also be constructed of metal such as fences, gates, streetlights, signs and statuary. Each type of metal has its own unique properties and may require different treatments. Therefore, each project involving architectural metal should be considered individually based on the type of metals utilized in the historic building. The following guidelines provide assistance to ensure building and landscape elements constructed of architectural metal are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Architectural Metal Features:

- Cast iron facades
- Cornices
- Siding
- Roofing materials
- Gutter Systems
- Window sashes
- Doors and hardware
- Fences and gates
- Statuary and monuments

The use of architectural metals provides character and architectural interest to this building.
United States Air Force Academy, Colorado

Metal provides the structural framework for this fire tower at Fort Stewart, Georgia.

Guidelines for Architectural Metals

1. Identify, preserve and retain historic architectural metal features including but not limited to: roofs, gutter systems, architectural details, siding, and railings.

2. Protect, maintain and repair architectural metal surfaces and features through appropriate preservation methods.

3. If replacement of a deteriorated detail of an architectural metal surface or feature is necessary, only replace the damaged portion. Replace in-kind matching the original detail in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of an entire detail of an architectural metal surface or feature is necessary, replace in-kind by matching the original detail or element in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If an architectural metal surface or feature is completely missing, replace it with new material based on documentary or physical evidence by matching the original in material, size, shape, design, scale, color, and craftsmanship or using a new design compatible with the character of the building and/or historic district.

6. Avoid painting metal surfaces if they were not painted historically or removing paint from historically painted surfaces. It is appropriate to repaint historically painted architectural metal surfaces and features in colors that are compatible for the historic building and district.

7. It is inappropriate to clean soft architectural metal surfaces and features with abrasive methods like grit blasting.

8. Clean hard metals such as cast iron, wrought iron and steel using the gentlest means possible before attempting other methods.

9. It is inappropriate to apply new architectural metal features, where none ever existed, to a building to create a false historical appearance. Such features include but not limited to: cresting, grates and window hoods.

10. It is inappropriate to patch or replace metal roofs or flashing with tar or asphalt products.

11. See the other sections of this chapter for further guidance related to architectural metal surfaces and features.

7.6 Decorative Architectural Details

Decorative architectural details appear on historic buildings in a variety of forms and materials to accent walls, windows, doors, entrances, porches and roof lines. The details add architectural interest to the building. Decorative architectural details are essential in defining the character of a historic building and are important in identifying the building's architectural style and period of construction. For instance, decorative brackets underneath the roofline are characteristic of the Italianate style of the mid to late 19th century, while gingerbread trim demonstrates the Queen Anne style of the late 19th century.

Various decorative architectural details such as quoins, dentil cornice, pediment, recessed arches and garland add character to a building. Fort Lewis, Washington

Although decorative architectural details are relatively small elements of a building and usually do not serve a structural function, they are still significant to a historic building. Decorative architectural details should be carefully considered during rehabilitations or other treatments to historic buildings. The guidelines on the following pages provide assistance to ensure decorative architectural details are protected and preserved. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Decorative Architectural Details:

- Brackets
- Festoons or swags
- Cornices and other moldings
- Quoins
- Bargeboard or vergeboard
- Trim and spindle work
- Patterning of brick, wood or other building materials
- Lintels
- Pediments and columns

Concrete detail of a horse accents a doorway.
F.E. Warren Air Force Base, Wyoming
Photo courtesy of CRM, F.E. Warren Air Force Base

Guidelines for Decorative Architectural Details

1. Identify, preserve and retain historic decorative architectural details including but not limited to: brackets, trim, molding, cornices, quoins, lintels and balustrades.

2. Protect, maintain and repair decorative architectural details and their material through appropriate preservation methods.

3. If a portion of a decorative architectural detail is deteriorated beyond repair, it is appropriate to replace in-kind only the damaged portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of an entire decorative architectural detail is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If a decorative architectural detail is missing, replace it by matching the original in material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence or using a new design compatible with the character of the building and/or historic district. Documentary evidence can include original plans, historic photographs or and shadow marks or evidence on the building or structure itself.

6. It is inappropriate to remove decorative architectural detail.

7. It is inappropriate to apply new decorative architectural details, where none ever existed, to a historic building to create a false historical appearance. Such features include but are not limited to: balustrades, pediments and lintels.

8. For further guidance, see the other of the sections in this chapter.

Garlands and dentil molding accent bay window. Naval Station Bremerton, Washington

7.7 Exterior Paint, Coatings and Color

Exterior paint colors are a reversible change to a building; however certain colors can enhance a building's architectural details or overpower and often conceal architectural details. When choosing paint colors for a historic building, consider the colors' influence on the character of the building and/or historic district. Also consult your installation's design guide or protocol for paint color for certain types of buildings and/or building areas.

The proper maintenance of exterior paint and coatings is important to ensure the preservation of a building. A sound paint film on wood or metal materials or features is essential in avoiding their deterioration by water and insects. Wood and metal features on historic buildings such as trim, windows, doors and cornices were usually painted and therefore should be routinely painted. Additionally, brick, concrete and other masonry features including foundations and porches that were originally painted should also be routinely painted. However, brick, concrete and other masonry features that have not been previously painted should not be painted. Normally, paint on these features regularly chips and peels in a short period of time leaving the surface in an unsightly condition. The general rule of thumb for exterior paint is if it is not painted, do not and if it is painted, maintain a sound film of paint. The guidelines on the following page provide assistance for the maintenance and preservation of exterior paint, coatings and color for historic buildings and districts. For additional guidance, consult your installation's protocol and your SHPO.

CAUTION: Some paints on military installations may contain lead, contact the appropriate Hazardous Materials personnel for guidance before undertaking a painting project. Please also consult the National Park Service's *Preservation Brief 37, Appropriate Methods for Reducing Lead-Paint Hazards in Historic Housing* for further guidance.

Examples of Previously Painted Surfaces:

- Wood siding
- Wood architectural details
- Masonry foundations
- Brick or stucco walls
- Metal roofs
- Metal architectural details

The effects of painting surfaces not meant to be painted.
Avoid painting brick, concrete and glass, if not historically painted.

Guidelines for Exterior Paint, Coatings and Color

1. Preserve and protect original exterior building surfaces and features that were painted by maintaining a sound paint film on them.

2. Protect and maintain previously painted exterior surfaces in appropriate methods such as:
   - Regular cleaning of painted surfaces using the gentlest means possible; and
   - Remove peeling or deteriorated paint films down to the first sound paint layer before repainting using the gentlest means possible including hand-scraping.

3. Select paint colors appropriate to the character of the building and/or historic district. Be sure to choose colors that enhance a building's architectural details.

4. It is inappropriate to paint exterior surfaces especially brick, stucco, concrete and glass if they were not painted historically.

5. It is inappropriate to remove paint films before repainting with abrasive and destructive methods such as sandblasting, water-blasting, power washing or use of propane or butane torches.

6. For further guidance, see the other of the sections in this chapter (Roofs and Details; Foundations and Walls; Windows and Doors; Entrances, Porches and Balconies; Building Materials and Decorative Architectural Details.

8.1 Interior Spaces, Features and Finishes

Interior spaces, features and finishes are important in defining the historic character of a building. During rehabilitations and renovations, interiors should be considered to protect and preserve the overall historic fabric of a building; especially for those buildings individually listed on or eligible for listing on the National Register of Historic Places, and National Historic Landmark buildings and districts.

Decorative plaster ceiling is an example of an interior feature. Fort Bragg, North Carolina

All buildings, regardless of type and function, are composed of a series of primary and secondary interior spaces. Primary spaces in military buildings include entrance lobbies, rotundas, theaters, assembly and dining halls, classrooms, offices of commanders, hallways, and residential living rooms. Primary spaces are clearly defined by their features and finishes as well as their size and proportion of the rooms themselves. These characteristics create the visual character of a building. Secondary spaces are typically less ornate and consist of those areas that service primary spaces. Secondary spaces include hallways, secondary stairs, storage rooms, utility spaces, bathrooms, equipment rooms and residential bedrooms. Changes usually can be made in secondary spaces without harming the overall historic character of the interior. The following guidelines provide assistance to protect and preserve interior spaces, features and finishes during rehabilitations and renovations. For additional guidance, consult your installation's protocol and your SHPO.

Example of historic interior features. Norfolk Naval Shipyard, Virginia. Photo courtesy of Department of the Navy

Examples of Interior features and finishes:

- Columns
- Cornices
- Baseboards
- Fireplaces and mantels
- Built-in cabinets and bookcases
- Paneling (bead board, wainscoting)
- Light fixtures
- Flooring (wood, terrazzo)
- Plaster
- Decorative finishes (stenciling, graining, and marbling)
- Murals

Guidelines for Interior Spaces, Features and Finishes

1. Identify, preserve and retain character-defining historic interior spaces, features and finishes in primary spaces and when possible secondary spaces including but not limited to: floor plan, volume of rooms, ceiling height, and features and finishes of the floors, walls, and ceiling.

2. Protect, maintain, and repair character-defining historic interior spaces, features and finishes in buildings through regular inspections and appropriate surface cleaning techniques and other maintenance measures. During the rehabilitation of a building, install protective coverings over any delicate features and/or finishes so not to damage the historic material.

3. If a portion of an interior feature or finish is deteriorated beyond repair, it is appropriate to replace in-kind only the damaged portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If replacement of an entire interior feature or finish is necessary, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

5. If an interior feature or finish in a primary interior space is missing, replace it by matching the original in material, size, shape, design, scale, color and craftsmanship based on documentary or physical evidence or using a new design compatible with the character of the building and/or historic district. Documentary evidence can include original plans, historic photographs or and shadow marks or evidence on the building itself.

6. It is inappropriate to remove any character-defining historic interior feature or finish in a primary interior space.

7. It is inappropriate to apply new interior features and finishes, where none ever existed, to a historic building to create a false historical appearance. Such features include but not limited to decorative finishes such as stenciling or marbling, columns and moldings.

8. Alterations to the building for adaptive reuse should primarily be contained to secondary and other non-character-defining interior spaces. Alterations should be sensitive to the historic features and finishes so as not to destroy, damage or obscure the historic interior fabric especially in primary spaces.

9. For further guidance, see the remaining sections in this chapter.

8.2 Interior Structural Systems

Interior columns were preserved during the rehabilitation of a former mess hall into office space. Naval Station Great Lakes, Illinois

The interior structural system of a historic building can be significant to the building's history and historic character. There are various types of structural systems that have evolved through time as building technology advanced. Types of structural systems included but are not limited to the following: balloon frame construction (19th century), load-bearing masonry construction (18th cen-tury), heavy masonry and steel construction (19th century), skeletal steel construction (19th century) and concrete slab and post construction (20th century).

For the purpose of these guidelines, there are two general categories of structural systems, which are exposed and unexposed. Exposed structural systems often include important character-defining features of a building's interior. Exposed features include load-bearing brick walls, cast iron, metal or concrete columns and beams, roof trusses, posts and beams, and stone foundation walls. These features help to define the interior space and provide character to a building's interior. For instance, the exposed roof trusses in hangars are key character-defining features since they are an integral part of the building's interior architecture. Unexposed structural systems are less visible but, nonetheless, can be significant to the building. Unexposed structural systems include features such as post and beams, a steel skeletal or cast iron columns. These systems have the potential to be significant in terms of the building's technology, such as an innovative structural system or an important or unique use of a material.

Both exposed and unexposed structural systems should be examined and evaluated during the early stages of a project to determine their physical condition and importance to the building's historic character and significance. During rehabilitations or other treatments of historic buildings, structural systems should be considered to ensure the protection and preservation of a building's historic interior especially for those buildings individually listed on or eligible for listing in the National Register for Historic Places, and National Historic Landmark buildings and districts. The following guidelines provide assistance to protect and preserve of historic interior structural systems during rehabilitations and renovations. For additional guidance, consult your installation's protocol and your SHPO.

Guidelines for Interior Structural Systems

1. Identify, preserve and retain historic character-defining interior structural systems and their features including exposed and unexposed systems and features.

2. Protect and maintain historic character-defining interior structural systems and their features in historic buildings through regular inspections and appropriate preservation methods.

3. Repair interior structural systems and their features either by augmenting or upgrading individual parts or features using compatible materials that will not harm the system or feature and not alter the historic character of the system or feature.

4. If a system or feature is deteriorated beyond repair, replace in-kind by matching the original in material, size, shape, design, scale, color and craftsmanship. Use compatible substitute materials if the original material is no longer available.

5. It is inappropriate to remove or radically change features of a historic interior structural system that are important in defining the overall character of the building.

6. Alterations to the building should not obscure, damage or destroy the interior structural system and its features. Design and install mechanical and electrical systems to minimize the alteration or damage to a structural system or feature. For example, limit the number of cutouts or holes in a structural member or feature.

7. See following the other sections of this chapter (Interior Spaces, Features and Finishes; and Mechanical and Engineering Systems) for further guidance related to interior structural systems.

Examples of Features of Interior Structural Systems:

- Brick walls (load-bearing)
- Interior columns
- Roof trusses
- Posts and beams
- Stone foundation walls

An exposed roof truss enhances the character of a building's interior. Fort Belvoir, Virginia

8.3 Interior Mechanical and Engineering Systems

Mechanical and engineering systems provide necessary amenities for historic buildings and are vital to the function and use of any building. Mechanical systems such as electrical, plumbing, and heating and air conditioning are late 19th century and early 20th century innovations that have offered convenience and comfort to building users. When these systems were incorporated into buildings, their functional elements became integral parts of a building's interior. Many times these elements were designed as decorative features associated with the building's interior architecture. Visible historic decorative features of mechanical systems include grilles, lighting fixtures, ornamental switch-plates, plumbing fixtures, and radiators and radiator covers.

Additionally, engineering systems are important to numerous military buildings as they provide the means necessary to create mission-specific environments such as wind tunnels and bomb-sight testing facilities. These engineering systems derive their visible historic character from their functional requirements and use of certain materials rather than decorative features.

Mechanical and engineering systems should be examined and evaluated during the early stages of a project to determine their physical condition and importance to the building's historic character and significance. Visible decorative features of mechanical systems and essential components of engineering systems should be carefully considered during rehabilitations and other treatments of historic buildings especially for those buildings individually listed on or eligible for listing in the National Register of Historic Places, and National Historic Landmark buildings and districts.

The placement of new HVAC is sensitive to the historic exposed wood structural system.
Peterson AFB, Colorado

Examples of Interior Mechanical and Engineering Systems Features:

- Grilles and registers
- Lighting fixtures
- Plumbing fixtures
- Ornamental switch-plates
- Radiators and radiator covers

The functioning components of mechanical systems in most cases will need to be replaced and/or upgraded in order to meet current building code requirements. Components or features include but are not limited to: compressors, wiring, ductwork and pipes. These features should be replaced or upgraded in a manner sensitive to the visible historic elements of a mechanical system and the historic character of the building. The following guidelines provide assistance to protect and preserve historic mechanical and engineering systems. For additional guidance, consult your installation's protocol and your SHPO.

Guidelines for Interior Mechanical and Engineering Systems

1. Identify, preserve and retain historic character-defining interior mechanical and engineering systems and their features including but not limited to: radiators, vents, fans, grilles, plumbing fixtures, lighting fixtures and switch plates.

2. Protect and maintain interior mechanical and engineering systems and their features in historic buildings through regular inspections and appropriate preservation methods.

3. Repair historic interior mechanical and engineering systems and their features by replacing non-visible features and components such as wiring, ducts, pipes and compressors. It is appropriate to locate these new non-visible features and components in wall cavities or secondary and non-character-defining spaces. If possible, do not lower ceilings in primary interior spaces.

4. If a visible feature of a historic mechanical or engineering system is deteriorated beyond repair, replace in-kind by matching the original in material, size, shape, design, scale, color, and craftsmanship. Use compatible substitute materials if the original material is no longer available.

5. It is inappropriate to remove or radically change features of a historic mechanical or engineering system that is important in defining the overall character of the building.

6. If a new mechanical or engineering system is required for a new use, install a compatible system that will cause minimal alteration or damage to a building's floor plan, interior features, exterior elevations and historic material. If possible, do not lower ceilings in primary spaces.

7. If possible, maintain in situ visible character-defining components and features of mechanical and engineering systems such as grilles, vents, lighting fixtures and radiators, even if no longer functional.

8. Design and install mechanical systems to minimize the alteration or damage to a structural system or feature. For example, limit the number of cutouts or holes in a structural member or feature.

9. See the other sections of this chapter as well as Section 10.4 Utilities, Energy Efficiency and Sustainability for further guidance related to interior mechanical and engineering systems.

9.1 Additions to Historic Buildings

In general, there are two types of additions to historic buildings: 1) those that are historic in their own right; and 2) recent and proposed new additions. Historic additions that contribute to the significance of a building are important in interpreting the evolution of a building. These additions were usually constructed out of need for additional space to accommodate new functions and requirements for the building owners and tenants. Therefore, the additions help to tell the complete evolution of the building. Historic additions should be protected and preserved as character-defining elements to a building and as contributing to the overall historic character of the building and/or district.

Recent or proposed new additions in contrast can significantly alter the historic exterior appearance of a building, therefore, it is important to consider alternatives prior to expanding the building. One such alternative is the alteration or re-design of non-character-defining interior spaces to successfully accommodate the new use. If alternatives are determined impractical, a new attached exterior addition may be an acceptable approach in consultation with your SHPO. New exterior additions should not compromise the integrity of the historic building and/or district. This includes radically changing, obscuring, damaging, or destroying character-defining elements of historic buildings and districts such as features, materials, and spatial relationships. Additionally, the design of new additions should be differentiated from the design of the historic building to prevent creating a false historical appearance, but compatible in mass, form, material, color, scale and spatial relationship. New additions should also be constructed in a manner so that they can be removed in the future without damaging the historic fabric of the building as well as located on inconspicuous elevations to protect the historic views of the building and/or district. The guidelines on the following pages provide assistance to ensure historic additions are protected and preserved and new additions are compatible with the character of historic buildings and/or districts. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Additions:

- Wings
- Attached carports
- Canopies
- Porches
- Decks
- Patios
- Balconies
- Exterior elevator shafts
- Exterior stairs (enclosed or open)

The side additions to this 1933 theatre were constructed in 1939 and thus are considered historic additions. Fort Bragg, North Carolina. Photo courtesy of Fort Bragg CRMP

Guidelines for Historic Additions

1. Identify, preserve and retain historic additions and their associated functional and decorative features.

2. Protect, maintain and repair historic additions through routine maintenance and appropriate preservation methods.

3. It is inappropriate to remove historic additions to a building unless part of a restoration treatment plan for the historic principle structure.

4. It is inappropriate to apply new features, where none ever existed, to a historic addition to create a false historical appearance.

5. See the other sections in Chapter 6 (Design Guidelines-Site and Setting) and Chapter 7 (Design Guidelines-Changes to Building Exterior) for further guidance related to the functional and decorative features of a historic addition.

Guidelines for New Additions

1. Design new additions to retain and preserve the overall historic character of a historic building, landscape and/or district including such elements as the site, topography, landscape features and historic views and vistas. Consider altering or re-designing non-character defining interior spaces to accommodate the new use or service.

2. Construct new additions in a reversible manner so that the addition can be removed in the future with minimal damage to the historic building.

3. Design new additions to be compatible with the overall character of the historic building, site and/or district in terms of mass, form, material, color, scale and spatial relationship such as relationship of solids to voids. For additions, do not replicate existing historic buildings to avoid creating a false historical appearance. For example, use different building materials, roof forms and design of functional and decorative features.

4. Limit the size and scale of the new addition in relationship to the building to ensure the addition does not diminish, obscure or overwhelm the view and character of the historic building and/or district.

5. Locate new additions on secondary elevations such as rear or side elevations to limit visibility from the public right-of-way.

6. It is inappropriate to construct a new addition that will detract from the overall character of a historic building.

7. It is inappropriate to damage or remove adjacent historic buildings, historic accessory buildings and structures, landscapes or structures and archaeological resources when constructing a new addition.

8. See the next section, 9.2 New Construction, as well as the sections in Chapter 6 (Design Guidelines-Site and Setting) for further guidance related to new additions.

Rear porch was enclosed to provide additional interior office space. The enclosure uses glass placed on the inside of the original porch railings to minimize the impact to the historic building.
Fort Bragg, North Carolina

Reversible and compatible addition to this building provides exterior stairs.
Marine Corps Base Quantico, Virginia

Examples of Appropriate New Additions to Historic Buildings

Compatible rear porch additions of officer housing provides an additional bathroom.
Fort Hamilton, New York

Addition of compatible carports to historic housing.
Maxwell Air Force Base, Alabama

Exterior elevator addition (center) is compatible with the character of the building.
Langley Air Force Base, Virginia

9.2 New Construction

Compatible new construction in a historic district uses similar building material and architectural details with a modern touch. F.E. Warren Air Force Base, Wyoming

Military installations are not static environments and they are challenged with developing as their mission changes or as new standards are introduced. The architectural heritage of military installations represents this evolving environment. The majority of military installations have a collection of historic buildings that date from a range of years rather than from a single construction period. New construction on military installations can and should contribute and enhance the continuing evolution of an installation's architectural heritage. Therefore, new construction adjacent to historic buildings or within historic districts is not discouraged. However, new construction must be sensitive and compatible with the character of the historic building and/or district.

Prior to undertaking a new construction project, there must be an understanding of the distinct architectural character of the effected historic buildings, landscapes and/or districts. This includes a close examination of building materials, features and details as well as setting and site features like spacing, setback, placement, scale and orientation. New construction should not be a direct duplication of the distinctive architectural elements of existing historic buildings or landscapes to be a successful addition to a historic property or district. Rather, it should be of a contemporary design that is sensitive and compatible with these elements. Contemporary designs are usually preferred so that new buildings are representative of their period of architecture just as the historic buildings are representative of their architectural periods. For new construction projects, consult your installation's protocol and your SHPO. The guidelines on the following pages provide assistance to ensure new construction is compatible with the historic character of a building, landscape and/or districts.

Guidelines for New Construction

1. Locate and site new construction to be compatible with the surrounding buildings and landscape features of historic buildings, landscapes and/or districts including but is not limited to the following: setback, spacing, placement or distance from adjacent buildings and orientation.

2. Design new construction to retain and protect the overall historic character of a historic landscape and/or district including such elements as the site, topography, landscape features and historic views and vistas.

3. Design new construction to be compatible with the surrounding buildings and landscape features of a historic property and/or district in terms of height, form, massing, scale, size, proportion, roof type and architectural details.

4. Select materials and finishes for new construction that are compatible with the historic materials and finishes of surrounding historic buildings with regard to composition, scale, pattern, detail, texture, finish, color and sheen.

5. Design new construction to be compatible and sensitive to the historic buildings but do not replicate existing historic buildings. Avoid creating a false historical appearance.

6. It is inappropriate to damage adjacent historic buildings, historic accessory buildings and structures, landscapes and archaeological resources during a new construction project.

7. It is inappropriate to construct a new building, structure or landscape if it will detract from the overall historic character of a building and/or district or requires the removal of a significant building or site feature.

8. See Chapter 6 (Design Guidelines-Site and Setting); Sections 10.1 Accessory Buildings and Structures; and 10.2 Noncontributing Resources in Historic Districts for further guidance on planning for new construction.

Examples of New Construction:

- Buildings
- Garages and carports
- Playground equipment
- Monuments
- Recreational structures
- Cell Towers
- Site work

10.1 Accessory Buildings and Structures

Historic accessory buildings and structures provided support space to larger main buildings and as a result contribute to the overall historic character of buildings and districts. They add to the significance of a property and further enhance the understanding of the property's historical development. Historic accessory buildings and structures include but are not limited to the following: garages, kitchens, sheds, gazebos and tennis courts or other recreational structures. These buildings and structures usually match the architectural style or influence of the main buildings and have their own character-defining functional and decorative features. Historic accessory buildings and structures and their functional and decorative features should be protected and preserved as contributing elements to a historic property and/or district.

Additionally, noncontributing accessory buildings and structures are located within historic districts or adjacent to historic buildings. These buildings and structures include but are not limited to: sheds and storage units, garages, carports, smoking shelters, physical training equipment and playground equipment. Noncontributing and proposed new accessory buildings and structures should be treated as noncontributing resources to a historic property and/or district. Therefore, any exterior changes to the buildings or structures should not have a negative impact on the character of the historic setting and be compatible with the character of the historic building and/or district. For the construction of new accessory buildings and/or structures, consult Sections 9.2 New Construction and 10.2 Noncontributing Resources in Historic Districts for additional guidance.

The guidelines on the following page provide assistance when a project involves historic or noncontributing or proposed new accessory buildings and structures. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Accessory Buildings and Structures:

- Garages
- Carports
- Sheds and connexes
- Trailers
- Kitchens and outbuildings
- Gazebos
- Tennis courts
- Recreational structures
- Trash and recyclables containers

This historic barn adds to the character of a historic property.
Fort Carson, Colorado

Guidelines for Accessory Buildings and Structures

1. Identify, preserve and retain historic accessory buildings and structures and their details, materials, and functional and decorative features.

2. Protect, maintain and repair historic accessory buildings and structures and their features through appropriate preservation methods.

3. If a feature or element of a historic accessory building or structure is deteriorated beyond repair, replace only the damaged portion and match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

4. If a historic accessory building or structure is missing entirely, replace it based on documentary or physical evidence that matches the original in material, size, shape, design, scale, color and craftsmanship or using a new design compatible with the historic character of the building and/or district. Documentary evidence can include original plans, historic photographs and shadow marks or physical evidence on the building itself.

5. It is inappropriate to replace, damage or destroy historic accessory buildings and structures.

6. It is inappropriate to apply new features, where none ever existed, to a historic accessory building or structure that creates a false historical appearance.

7. Design exterior changes to noncontributing accessory buildings or structures in a manner that preserves the character of the historic property and/or district in terms of the material, color, form, scale, massing and craftsmanship.

8. Locate, site and design new accessory buildings and structures to be compatible with surrounding buildings, structures and landscape features of a historic property and/or district, including but not limited to the following: materials, color, form, scale, massing and craftsmanship and set features including setback, spacing, placement or distance from adjacent buildings and orientation.

9. Limit the size and scale of the new accessory building or structure in relationship to the primary historic building to ensure the view and character of the historic building is not diminished or obscured.

10. It is inappropriate to construct or alter an accessory building or structure if it will detract from the overall historic character of a historic property; requires the removal of a significant building or site feature; and/or damages archaeological resources.

11. See the other sections in Chapter 6 (Design Guidelines-Site and Setting) and Chapter 7 (Design Guidelines-Changes to Building Exterior) as well as Sections 9.2 New Construction and 10.2 Noncontributing Resources in Historic Districts for further guidance related to the historic and contemporary accessory buildings and structures.

Historic garage/carriage house
Norfolk Naval Shipyard, Virginia
Photo courtesy of the Department of the Navy

Historic guardhouse, Marine Corps Recruit Depot San Diego, California

Historic accessory building, flare room
Randolph Air Force Base, Texas

Examples of Compatible New Accessory Buildings and Structures

New public restroom, located in a historic district, built with similar architectural details of surrounding historic buildings such as columns and roof-line. Fort Bragg, North Carolina

New carport utilizes similar building materials to minimize its impact to the historic district. Fort Benning, Georgia

10.2 Noncontributing Resources in Historic Districts

A historic district, as defined by the National Park Service, is "a district that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development."[111] In order to define a historic district, boundaries are developed to encompass the geographical area that contains all the properties with a shared relationship that contribute to the historical significance of the area. To maintain a continuous area, usually these districts also include properties that do not contribute to the historical significance, which are identified as noncontributing. Noncontributing resources can include buildings, landscapes, structures and objects that are either less than 50 years old or have been altered significantly and no longer have integrity. Although these resources do not contribute to a historic district, they can have an impact on the character and integrity of the district. In order to minimize their impact, noncontributing resources, whether existing or new, should be sensitive and compatible with the visual and historic character of a historic district. The guidelines on the following page provide assistance when a project involves alterations to the exterior of noncontributing resources in a historic district. For additional guidance, consult your installation's protocol and your SHPO.

Contemporary playground equipment is a noncontributing structure in historic districts.
Fort Benning, Georgia

1970s review stand is a noncontributing structure situated on a historic parade field.
Fort Bragg, North Carolina

Examples of Noncontributing Resources:

- Buildings
- Structures such as playground equipment, bleachers, and smoking shelters
- Swimming pools and bath houses
- Landscapes
- Objects such as monuments, and public art

[111] *Bulletin 15, How to Apply National Register Criteria for Evaluation,* (Department of the Interior, National Park Service: last revised 2002), 5.

Guidelines for Noncontributing Resources in Historic Districts

1. Design new noncontributing resources including but not limited to: buildings, gazebos, smoking shelters, physical training equipment and playground equipment to be compatible with the character of the historic district in terms of mass, form, material, color, scale and spatial relationship.

2. Design new additions to noncontributing resources to be compatible with the overall character of the building, site and/or historic district in terms of mass, form, material, color, scale and spatial relationship.

3. Any exterior changes to an existing noncontributing resource should be compatible with the overall character and setting of the historic district in terms of mass, form, materials, color and scale.

4. See Sections 9.1 Additions to Historic Buildings; 9.2 New Construction and 10.1 Accessory Buildings and Structures for further guidance related to noncontributing resources.

Example of a noncontributing building in a historic district. Fort Bragg, North Carolina

Example of a noncontributing building in a historic district. F.E. Warren Air Force Base, Wyoming

10.3 Accessibility and Public Health and Safety

This curved ramp at Fort Bragg, North Carolina uses the landscape and has minimal impact to the historic building. Photo courtesy of Fort Bragg CRMP

Accessibility and public health and safety are important factors to consider during rehabilitations of historic buildings. With regards to accessibility, several federal laws have been enacted requiring public buildings to be accessible to persons with disabilities. The most important of these laws are the Architectural Barriers Act of 1968, Section 504 of the Rehabilitation Act of 1973 and, most recently, the Americans with Disabilities Act (ADA) of 1990. In order to comply with these laws, historic buildings should undergo modifications to allow access into the buildings. Modifications to a building may require exterior alterations such as the addition of exterior ramps and chair lifts and modification of doors and entries, as well as interior modifications such as the addition of elevator shafts and widening of hallways and entryways.

Public health and safety is another area of consideration during rehabilitations. When rehabilitating or upgrading a historic building, it is important to consider compliance with the current health and safety codes that include but are not limited to: public health, occupational health, life, safety, fire safety, electrical, seismic, force protection, structural and building codes. These codes include such items as hazardous materials like lead; adequate ingress and egress to fire exits; appropriate lighting; securing buildings for force protection; and securing building elements to meet seismic, or other natural disaster standards. Consult your service's protocol and guidance on specific code compliance requirements at your installation as well as the proper Hazardous Materials personnel before undertaking any project since materials in historic buildings and structures may contain lead, asbestos or other hazardous materials.

When modifications are necessary to address accessibility and public health and safety, careful design and planning are needed to ensure the historic building's interior and exterior character-defining features are protected and preserved. The general rule of thumb is to provide the highest level of accessibility and public health and safety with minimal impact to the historic building and site. The guidelines on the following page will provide assistance to ensure modifications for accessibility and public health and safety do not adversely impact a historic building and/or district. For additional guidance, consult your installation's protocol and your SHPO.

Guidelines for Accessibility

1. Comply with barrier-free access requirements in a manner that preserves character-defining interior and exterior spaces, materials, features and finishes, landscape or site features, and historic districts.

2. Design and locate exterior access systems such as ramps, chair lifts or new doors to be compatible with the character of the historic building, site and/or district in terms of material, finishes, color, scale and craftsmanship.

3. Construct new exterior access systems in a reversible manner in which the system can be removed in the future with minimal damage to the historic building

4. It is appropriate to modify historic entrances, doors and thresholds as well as installing power door assists or other equipment in a manner that preserves the character-defining features of the door and its surround.

5. It is appropriate to modify primary historic interior spaces to provide accessibility in a manner that preserves the character-defining features, materials and finishes of the interior space.

6. It is appropriate to install interior elevators in non-character-defining spaces or add new elevator shafts to secondary elevations such as side or rear elevations to limit its visibility from the public right-of-way.

7. Provide proper protection to historic landscape features, building interior and exterior features and archaeological resources during renovations for accessibility systems.

Examples of Accessibility and Public Health:

- Handicap ramps
- Chair lifts
- Exterior stairs or fire escapes
- Disaster reinforcements—hurricane ties
- Lighting
- Security bars

The historic doors on this building have been replicated for use as automatic doors. Peterson Air Force Base, Colorado

Guidelines for Public Health and Safety

1. Comply with health and safety codes including building codes and seismic codes requirements in a manner that preserves character-defining interior and exterior spaces, materials, features and finishes as well as site features and historic character of historic buildings and/or districts.

2. It is appropriate to install fire suppression systems, fire-retardant coatings, lighting systems or other code compliance systems in a manner that preserves character-defining features, materials and finishes.

3. Historic light features should be re-lamped or rewired and reused to meet safety and codes rather than replaced. Consult Section 6.8 Lighting for further guidance.

4. It is appropriate to upgrade historic stairways, entry ways and elevators to meet current codes in a manner that preserves their character-defining features, materials and finishes.

5. Design and locate new exterior stairs, ramps or code-required elevators to be compatible with the character of the historic building, site and/or district in terms of material, finishes, color, scale and craftsmanship.

6. Construct new exterior stairs, ramps or code-required elevators in a reversible manner so that the system can be removed in the future with minimal damage to the historic building.

7. It is appropriate to install exterior stairs, ramps or code-required elevators in non-character-defining spaces or as new additions to secondary elevations such as side or rear elevations to limit its visibility from the public right-of-way.

8. It is appropriate to install electronic security systems instead of physical barriers such as grilles, grates or security doors on character-defining facades or interior spaces or in a site. If physical barriers are required, install barriers in a manner that preserves the character-defining interior and exterior spaces, materials, features and finishes.

9. Install free-standing exterior security barriers to be compatible with the character of the historic building, site and/or district including landscape features.

10. Follow your installation's protocol for the abatement and treatment of toxic and hazardous building materials.

11. Provide proper protection to historic landscape features and building interior and exterior features during abatement procedures.

Examples of Appropriate Accessibility and Public Safety Alterations and Additions

Accessibility:

The handicap ramp was added to the side of this building to minimize the impact but provide accessibility.
F.E. Warren Air Force Base, Wyoming

The impact of chair lifts can be softened with a vegetative screen such as the use of vines.
Fort Sam Houston, Texas

Public Safety:

Compatible earthquake and wind retrofit.
Naval Station Bremerton, Washington

Exterior stair and fire escape located to the rear of the building to minimize its impact. Fort Hamilton, New York

10.4 Utilities, Energy Efficiency and Sustainability

Upgrading mechanical systems and utility services along with energy efficiency and conservation are important concerns on military installations. These concerns should be addressed in a manner that preserves the historic character of a building, site or district. Prior to retrofitting a historic building, the retrofit measures should be analyzed for their impact to the character-defining features of the building and/or historic district. If the measure will conceal, remove or damage a character-defining feature(s) of a historic building, site or district, explore other alternatives. Furthermore, the inherent energy-conserving features should be evaluated to see if they are operable and can be retained or enhanced (without damage) to increase energy efficiency. Historic buildings traditionally were designed to conserve energy and features such as windows, doors, transoms, awnings, shutters and landscaping were designed in response to the climate and site conditions. A better understanding of a building's historic energy-conservation features and how they work can assist in maximizing a historic building's energy efficiency.

Another consideration is sustainability. The reuse and rehabilitation of historic buildings can assist DoD's implementation of sustainability initiatives for existing buildings. The preservation of historic buildings maximizes the use of existing materials and infrastructure, uses embodied energy in existing building materials, reduces waste, and preserves the historic character of installations – all requirements of sustainability.

The LEED rating system developed by the USGBC is the current standard for sustainable design and installations should utilize their guidance for LEED-Existing Buildings (LEED-EB) during rehabilitation projects. LEED-EB is less invasive to historic buildings than LEED-New Construction (LEED-NC). However, major rehabilitations and new additions to historic buildings should use the LEED-NC standards due to the scale of the project. For additional guidance on the LEED standards as related to historic buildings, sites and districts, consult the report for Legacy Project 04-220 *DoD Sustainability Application Guide for Historic Properties* developed by ERDC-CERL. The report outlines specific guidance for obtaining LEED credits for sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality and innovation in upgrades, operations and maintenance.

Military installations have the responsibility to be good environmental stewards, which includes preservation of cultural resources as well as energy conservation and sustainability. The guidelines on the following pages provide assistance to reduce or avoid adverse impacts when making modifications for utilities, energy efficiency and sustainability. For additional guidance, consult your installation's protocol and your SHPO.

Examples of Inherent Energy Efficiency and Sustainability Features:

- Windows, including storm windows
- Transoms
- Doors, including storm doors
- Skylights
- Cupolas
- Porches
- Awnings and shutters
- Landscaping

Guidelines for Utilities, Energy Efficiency and Sustainability

1. Identify, preserve and retain the inherent energy-conserving features of historic buildings, sites, and districts including but not limited to: street trees, shade trees, porches, awnings and operable windows, transoms, shutters and blinds.

2. Determine whether inherent energy-conserving features such as windows, storm windows, cupolas, clerestories, skylights, transoms, doors, shutters and awnings are operable. If non-operable, repair them back to a state of utility rather than replacing.

3. It is appropriate to increase the thermal efficiency of historic buildings by using acceptable traditional practices such as weather-stripping, caulking and the installation of storm windows and doors. Use of modern energy conservation techniques can be acceptable, consult with your SHPO for options.

4. If historically appropriate, with documentary evidence to support, install awnings or shutters over window, door and porch openings. Ensure they are installed in a manner that does not damage the historic fabric or features of the building.

5. If a new mechanical system is necessary, install it so that is causes minimal alteration and impact to the building's exterior façade, character-defining interior spaces, historic fabric, materials, features and site features.

6. Locate new exterior mechanical systems on secondary elevations in inconspicuous locations such as on the rear façade, to limit the visibility from the public right-of-way. Systems include but not limited to: heating and air-conditioning units, meters, exposed pipes and above ground storage fuel tanks. Screen the view of the system using landscaping or fences and walls appropriate to the historic character of the building and/or district. Consult Section 6.5 Fences and Walls for further guidance.

7. It is inappropriate to install ventilators, solar collectors, antennas, wind turbines, satellite dishes or other mechanical equipment in locations that compromise character-defining roofs or on-roof slopes that are visible from the public-right-of-way or streetscape.

8. Place free-standing wind turbines or other alternative energy source equipment and large-scale equipment such as antennas and satellite dishes in locations not visible from the street and, if possible, screened from the view. Make sure that the installation of equipment does not impact archaeological resources or historic landscape features.

9. The use of exterior or interior storm windows or doors is appropriate if they are installed in a manner that does not obscure or damage the existing sash, frame and surround. The design, materials, size and scale of the storm windows or doors should be appropriate with the historic character of the building and/or district. For instance, if the window is a double-hung window, install a storm window that has a meeting rail that matches the existing sash; is in the same color as the existing sash; and has a narrow profile.

10. 'Green' roof designs should not compromise the historic materials, features and character of a building and/or district. The view from the ground level should be minimized.

11. Historic light features should be retrofitted with more energy efficient lighting rather than removed or replaced. Consult Section 6.8 Lighting for further guidance.

12. If feasible, utility lines such as power lines, telephone lines and cable lines should be located underground in historic districts. Make sure to avoid archaeological resources and historic landscape features and follow your installation's protocol for locating other underground resources and utilities.

A wall constructed, using compatible materials, to screen a large HVAC system. Fort Benning, Georgia

Operating interior transoms can help increase a building's energy efficiency.
Fort Lewis, Washington

Inherent Energy Efficiency and Sustainability Features of a Historic Building

Guest Quarters
F.E. Warren Air Force Base, Wyoming

10.5 Force Protection

New bollards replicating historic ones lessen the visual impact to a historic district.
United States Military Academy, New York

Force protection is an important concern on military installations especially after the terrorist attacks of September 11, 2001. In order to protect civilians and military personnel living and working on military installations from future threats, DoD developed the Unified Facilities Criteria (UFC) 4-010-01 titled *DoD Minimum Antiterrorism Standards for Buildings,* as updated in January 2007. The document establishes the minimum antiterrorism standards for new and existing DoD buildings, which includes historic buildings. The implementation of the UFC does not supersede the legal responsibilities of installations involving cultural resources. Therefore, installations must protect historic buildings, sites, landscapes and districts from damage during undertakings that involve compliance with the UFC. Prior to the implementation of the UFC standards to a historic building, site, landscape and/or district, a comprehensive assessment should be conducted to analyze the character-defining features of the historic property and assess the potential impact of the undertaking to the historic property and its features.

In addition, consider conducting a risk management assessment on historic properties to determine their levels of protection and necessary force protection measures. For example, a warehouse with a low occupancy merits a lower level of protection than an administrative building, and an administrative building with a low occupancy merits a lower level of protection than a primary gathering building (50 or more DoD personnel routinely occupy the building). Therefore, the warehouse and administrative building require less force protection measures than a primary gathering building. In order to minimize the impact of force protection measures on a historic building, the building's function and level of occupancy should be considered and correspond with the lowest level of protection allowed.

Regardless of the level of protection, all force protection standards and antiterrorism measures are requirements on military installations but they can be implemented in a way that is sensitive and compatible with the character of historic buildings, sites, landscapes and districts. The guidelines on the following page provide assistance to ensure force protection measures do not adversely impact a historic building and/or district. For additional guidance, consult your installation's protocol and your SHPO.

Guidelines for Force Protection

1. Comply with force protection standards (UFC 4-010-01 standards) in a manner that preserves character-defining interior and exterior spaces, materials, features and finishes.

2. It is appropriate to install force protection systems and equipment such as security systems, cameras and surveillance equipment, lighting and other equipment in a manner that preserves character-defining spaces, features, materials and finishes.

3. Locate and site new buildings, structures and infrastructure for force protection, including but not limited to: access control points, bollards, fencing and barrier walls, in a manner that preserves the historic character of a building and/or district.

4. Design new buildings, structures and infrastructure for force protection to be compatible with the character of the historic building, site and/or district in terms of material, finishes, color, scale and craftsmanship. Consult Section 9.2 New Construction for further guidance.

5. If possible, locate small components of sensor and surveillance technologies under building eaves or inside light fixtures to minimize the impact to the historic fabric and visual impact of a building and/or district.

6. Locate ventilation equipment or other force protection utilities on inconspicuous elevations, such as on the rear façade, to limit the visibility from the public right-of-way and, if possible, screen from view utilizing landscaping or fences and walls appropriate to the character of the historic building and/or district. When possible, reuse rooftop ventilators to minimize the impact.

7. If possible, construct new force protection measures such as security bars, grilles, and ventilation equipment in a reversible manner so that the system can be removed in the future with minimal damage to the historic building.

8. It is inappropriate to remove, conceal, damage or destroy historic materials, features and finishes of historic buildings or landscapes for force protection purposes unless it cannot be avoided. If interior alterations are necessary, contain alterations to secondary and other non-character-defining interior spaces.

9. It is inappropriate to remove or destroy historic paving patterns including roads and parking areas. Appropriate alternatives include temporarily closing the road or parking areas with bollards or abandoning roads and parking areas in place.

10. It is appropriate to use less-invasive alternatives for the modification of structural systems to minimize the impact to the historic building's materials, features and finishes. Ensure the alteration to the structural system does not alter the appearance and character of the building's interior character-defining features such as columns walls, and volume of space.

11. It is appropriate to utilize alternatives for the replacement of historic glazed features such as windows, doors, transoms and skylights. Appropriate alternatives include the interior application of a secondary window system or the exterior application of a secondary window system (storm window or doors). The installation of these systems should minimize the impact to surrounding architectural features, materials and finishes such as surrounds and molding.

12. If alternatives for the replacement of glazed features are not feasible, it is appropriate to replace historic glazed features including but not limited to: windows, doors, transoms and skylights. Replacement units should match the original in size, shape, profile, design, scale, color, reflection and craftsmanship (for example, it is inappropriate to replace historic glass with mirrored glass). Alternative materials are acceptable if the original material (like wood) does not comply with the force protection (UFC 4-010-01 standards).

13. Provide proper protection to historic landscape and site features, archaeological resources and building interior and exterior features during modifications for force protection.

Rather than demolishing a historic paving pattern, use bollards to close off roads. Fort Benning, Georgia

Examples of Force Protection Features:

- Access Control Points
- Pedestrian gates
- Canopies
- Barrier walls
- Bollards
- Security fences
- Security bars or grilles
- Blast-proof windows and doors
- Sensor and surveillance equipment
- Paving patterns—parking lots, sidewalks, channelization islands, and vehicle inspection areas
- Setback or standoff of a building
- Landscaping
- Lighting

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10.6 Routine Maintenance

Routine inspections and maintenance are vital elements of the preservation process. Lack of maintenance of a historic property can accelerate its deterioration and ultimately lead to its demolition. Therefore, it is best to take a proactive approach to the maintenance of historic properties by conducting routine inspections. Inspections should closely examine and evaluate the condition of significant structural, architectural and decorative features. The inspection should also examine the resource for potential problems such as water intrusion or settlement. Inspections are a way to identify areas in need of maintenance or repair, as well as areas that may need extensive work in the future. Through routine maintenance, minor problems affecting a historic property can be remedied in a timely manner before the problem leads to irreversible damage to a historic feature or the entire property. The guidelines on the following page provide assistance about proper routine maintenance measures to protect and preserve historic properties. For additional guidance, consult your installation's protocol and your SHPO.

Make sure gutters divert water away from the building.
Photo courtesy of the Department of the Navy

Inspections should closely monitor minor cracks to avoid potential structural problems in the future.
Photo courtesy of the Department of the Navy

Look closely for potential water intrusions such as leaks in concealed built-in gutters (circled area above).
Photo courtesy of the Department of the Navy

Guidelines for Routine Maintenance

1. Inspect the roof to ensure it is weather tight. Missing shingles should be replaced in-kind and holes repaired according to appropriate preservation methods.

2. Inspect walls and foundations for insect and vermin infestation, moisture, cracks, deterioration and settlement. If problems occur, repair according to appropriate preservation methods.

3. Inspect the windows and doors to make sure they are operable and sealed properly to prevent water intrusion.

4. Inspect potential points for water intrusion such as crawl space openings, foundations and basement windows to make sure water is being diverted away from the historic property.

5. Inspect potential points for moisture intrusion such as masonry wicking in moisture, and condensation from poorly ventilated attics.

6. Gutter systems should be routinely cleaned and inspected to ensure they do not leak and discharge water away from the historic property.

7. Ensure that historically painted surfaces have a sound paint film, including but not limited to the following: walls, windows, doors, and architectural details.

8. Avoid painting or sealing unpainted masonry, glass or metal surfaces as this could accelerate deterioration.

9. Repair loose architectural features according to appropriate preservation methods, including but not limited to the following: brackets, rafters, pediments, cornices, balustrades, shutters, storm windows and doors, and siding.

10. Repair damaged structural features, such as masonry settling, eaves and porch posts, using appropriate preservation methods in a timely manner before further structural damage occurs.

11. Vegetation around the historic property should be maintained and pruned back from the walls and foundations at least 12 inches. Remove ivy or other vegetation from walls and remove overhanging dead tree limbs and branches.

12. Mechanical, electrical and plumbing systems should be routinely inspected to make sure they are operating efficiency and correctly.

10.7 Emergency Repair and Disasters

Inadvertent damage to a historic property can occur due to a multitude of reasons including natural disasters, fires, floods, high winds and utilities malfunction. It is imperative after such incidences that historic properties are closely inspected for damage, with particular attention to their structural systems. Appropriate repairs should be initiated quickly. Repairs can include temporary measures to stabilize and secure the property from further damage until permanent repairs can be made. For example, if there is substantial damage to the roof of a historic building, the use of tarpaulins is appropriate to temporarily protect the building. Also consider developing a Disaster Preparedness Plan in consultation with your SHPO to outline the proper protection of historic properties during natural disasters. The guidelines on the following page provide assistance should a historic property be inadvertently damaged. For additional guidance, consult your installation's protocol and your SHPO.

High winds and falling debris can cause roof damage to historic buildings. Fort Bragg, North Carolina
Photo courtesy of Fort Bragg CRMP

Fallen trees can harm historic buildings.
Fort Bragg, North Carolina
Photo courtesy of Fort Bragg CRMP

Diagram on how to properly use T Braces to support loose plaster.
Source: http://static.howstuffworks.com

Guidelines for Emergency Repairs and Disasters

1. Follow the Secretary of the Interior's Standards for the Treatment of Historic Properties in particularly the Standards for Preservation and Rehabilitation and consult the sections of design guidelines in this handbook.

2. It is appropriate to make temporary repairs to a historic property. The repairs should be done in a manner that will cause minimal harm to the historic property. Appropriate temporary repairs include the use of tarpaulins, plywood and bracing timbers to stabilize and secure the historic property.

3. Remove standing water from basements and crawl spaces; however, consult a structural engineer prior to pumping water since this can collapse foundations when groundwater is high.

4. Remove water-soaked insulation, wallboard and non-historic wall coverings.

5. Air dry the historic property with good ventilation. Never use systems that pump in super-dry air.

6. Remove debris from and around the historic property including dead overhanging tree limbs.

7. Support loose plaster with plywood and wood "T" braces (see diagram on previous page).

8. Clean and sanitize historic features first, using appropriate preservation methods such as non-abrasive cleaners.

9. Do not harm historic features when treating non-historic features.

10. Features that are deteriorated beyond repair must be replaced in-kind, replacing only the damaged portion using materials that match the original in material, size, shape, design, scale, color and craftsmanship. Use only compatible substitute materials if the original material is not available.

11. Conduct an inventory of found items, loose decorative elements, furnishings and collections. These items should be saved for reuse.

12. Properly stabilize and conserve furnishings and collections, including architectural drawings, photographs and other archival materials.

13. Consult your installation’s protocol and SHPO for natural disaster and emergency situations for additional guidance.

10.8 Mothballing and Layaway

The process of mothballing (also known as layaway) should only be employed when all means of finding a productive use for a historic building have been exhausted or lack of funds prevent the rehabilitation of the building into a usable condition. In these two circumstances, it is necessary to employ mothballing and temporarily close up the building to protect it from the weather and vandalism until the building can be rehabilitated in the future.

Proper planning is vital to the mothballing process to ensure the stabilization of the exterior and interior and the design of an adequate security system. The three highest priorities of mothballing are as follows:

1. Protect the building from sudden loss such as fire or vandalism;
2. Weatherize and maintain the building to stop moisture penetration; and
3. Control the humidity and air circulation levels inside once the building has been secured.

Once the building is properly mothballed, continued maintenance and monitoring should be conducted to increase the longevity of the building. The guidelines below provide the general measures that should be conducted as part of mothballing a building. For further guidance on specifics of mothballing or layaway procedures, please consult the protocol of your service and installation and your SHPO.

Guidelines for Mothballing and Layaway

1. Ensure that roofs are weather tight by replacing in-kind missing shingles or tiles and repair openings in an acceptable preservation method.

2. Gutters should be cleaned and inspected to ensure they do not leak and discharge water away from the building. Additionally, potential points of water intrusion such as basement windows and crawlspaces should be inspected and blocked to divert water away from the building.

3. Walls and foundations should be inspected for deterioration and damage. Make appropriate repairs to prevent moisture and water penetration. This includes repointing of masonry surfaces and repainting of wood siding.

4. Entry points should be sealed by closing door and window openings using infill materials such as plywood, corrugated panels and metal grates or grilles. It is suggested to use a piece of plywood that is slipped through the window or door and rests on the sill. The plywood is secured by attaching a horizontal furring strip (1" lumber) at the center of the plywood using a carriage bolt.

5. The installation of infill materials should not damage door and window openings and associated building features such as sashes, doors and frames.

6. Exterior doors should be reinforced and secured. If the historic doors would be damaged or disfigured by adding reinforcement, temporarily remove the doors and replace with secure modern doors. Store historic doors on site for reuse.

7. Shut off water utilities to the building and drain the pipes.

8. If the building has monitoring and alarm devices such as fire suppression systems, fire alarms and security alarms, they should remain operational—especially functional sprinkler systems.

9. Disconnect all electrical systems not necessary for security, fire prevention and/or ventilation.

10. Loose architectural and structural features such as brackets, porch posts, balustrades and mantels should be repaired. If repair is not feasible, document, remove and store the features on site.

11. Pest infestations should be exterminated and properly seal off their access to the building, which includes properly screening chimneys, vents, grills and louvers with a heavy duty wire mesh and termite treatments.

12. The building should be adequately ventilated. This will vary depending on the building, the climate and the building's freeze-thaw cycle. Solutions range from the covering of small openings with heavy duty wire mesh to forced air ventilation in humid climates.

13. Vegetation around the building should be pruned back from the walls at least 12 inches and remove overhanging dead tree limbs and branches.

14. A maintenance and monitoring plan should be developed to continue the stabilization of the building and slow the deterioration of the historic materials.

15. Seek alternative uses for the building by conducting an adaptive reuse study or plan.

11.1 Demolition and Relocation

Prior to demolishing a historic building, seek other uses for the building such as adaptive reuse. This former riding arena was converted into a gym. F.E. Warren Air Force Base, Wyoming

The demolition or relocation of a historic building, structure, site, object or landscape feature is detrimental to the integrity and character of a historic property, site and/or district. Demolition and relocation should only be considered as a last resort. For instance, relocating or moving a historic building is appropriate only to save it from demolition if all other alternatives such as rehabilitation and mothballing are not feasible. The decision to relocate a historic property should consider the following questions:

1. Is the resource threatened with demolition and is relocation the only alternative?
2. Is the resource structurally sound to survive the relocation and can it be adapted to its new site?

It is important to note that relocation does destroy the historic setting and context of the historic property possibly making it ineligible for the National Register of Historic Places (NRHP). However, through careful planning and in consultation with your SHPO prior to relocation, the resource can be moved to an area close to its original location that is similar in terms of setting and context and still maintain sufficient historic context for its eligibility to the NRHP. It is recommended that historic properties be documented prior to relocation.

The alternative of demolition is a permanent solution that results in the loss of a historic property for future generations and diminishes the character of a historic property and/or district. The decision to demolish a historic property should only be made after all possible alternatives are exhausted. To assist in the decision-making process, an economic analysis should be completed that assesses such factors as life cycle maintenance costs, utility costs, replacement costs and adaptive reuse as well as the cost to complete NEPA and Section 106 requirements and mitigation.

If demolition of a historic property will occur, consider salvaging the building materials for reuse. As part of Executive Order 13423, “Strengthening Federal Environment, Energy and Transportation,” and the DoD Instruction 4715.4, “Pollution Prevention,” federal agencies are

tasked with increasing their diversion of solid waste, which includes the recycling and reuse of construction and building materials. Additionally, the salvage of building materials promotes sustainability by reducing the amount of waste sent to landfills as well as reducing the environmental impacts associated with the production of new materials. For more information related to the reuse of building materials, consult the U.S. Army Corps of Engineers report, *Procurement Guidelines for the Reuse of Historic Building Materials* developed by John Cullinane Associates (available electronically on DENIX).

Since demolition and relocation will adversely affect a historic property, as part of the Section 106 Review process of the NHPA, mitigation will be required before the demolition or relocation begins. Consult your installation's protocol and your SHPO regarding the mitigation of cultural resources for additional guidance. The guidelines on the following pages provide assistance regarding the demolition or relocation of a historic property.

Guidelines for Demolition and Relocation

1. Prior to demolition or relocation, pursue and exhaust all other alternatives such as rehabilitation and mothballing. An economic analysis and feasibility study are recommended to justify demolition of a historic property.

2. A mitigation plan, usually as part of a Memorandum of Agreement, will have to be developed in consultation with your SHPO and mitigation completed prior to demolition or relocation of a historic property unless otherwise directed by your installation and/or SHPO.

3. If demolition or relocation occurs in a historic district or adjacent to a historic property, submit a site plan illustrating the proposed site development. Consult Sections 9.2 New Construction; 10.2 Noncontributing Resources in Historic Districts; and Chapter 6 (Design Guidelines-Site and Setting) for additional guidance on the proper infill for the property.

4. During demolition and relocation, protect adjacent historic buildings, sites, landscape features and archaeological resources from damage.

5. Before, during and after relocation, protect character-defining features of the building and site.

6. For relocations, move the resource to a new location with similar characteristics as the original location such as setting, setback, orientation, topography, geographical location and historical association.

11.2 Avoid Demolition by Neglect

Under NHPA, DoD and its installations are responsible for the maintenance and preservation of their historic properties including buildings, sites, landscapes, objects and districts. Prolonged periods without maintenance may lead to irreversible damage to a historic building's roof structural members and character-defining features and eventually cause structural failure and deterioration—also referred to as Demolition by Neglect. Demolition by Neglect is not an appropriate or acceptable treatment for historic properties and is considered an adverse effect under Section 106 of the NHPA. To avoid Demolition by Neglect, proper routine maintenance of a historic property is essential. Consult Section 10.6 Routine Maintenance; 10.8 Mothballing and Layaway; and Chapter 16, "Sources for Technical Assistance) for additional guidance. The following guidelines provide assistance to prevent Demolition by Neglect of historic properties. For additional guidance, consult your installation's protocol and your SHPO.

Guidelines to Avoid Demolition by Neglect

1. Conduct routine maintenance of historic properties and their features through routine inspections and complete repairs utilizing appropriate preservation methods. Consult 10.6 Routine Maintenance for additional guidance.

2. If a historic property is temporarily out of service or vacant, conduct appropriate mothballing or layaway procedures to ensure the preservation of its structural members. Consult Section 10.8 Mothballing and Layaway for further guidance.

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SECTION III. ADDITIONAL INFORMATION

Chapter

Old State Arsenal for Kentucky constructed in 1850.
Currently home to the Kentucky Military History Museum. Frankfort, Kentucky.
Photo courtesy of the Kentucky Army National Guard

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CHAPTER 13. LIST OF ACRONYMS

ACHP— Advisory Council for Historic Preservation

ADA— Americans with Disabilities Act of 1990

AFB— Air Force Base

AFCEE— Air Force Center for Engineering and the Environment

AFI— Air Force Instruction

AFPD— Air Force Policy Directive

AFS—Air Force Station

AIRFA— American Indian Religious Freedom Act of 1978

AR— Army Regulation

ARPA— Archaeological Resources Protection Act of 1978

CEMML— Center for Environmental Management of Military Lands

CMTC— Citizens Military Training Camp

CRM— Cultural Resources Management

CRMP—Cultural Resources Management Program

DAF— Department of the Air Force

DASA-ESOH— Deputy Assistant Secretary of the Army, Environment, Safety and Occupational Health

DASN (E)— Deputy Assistant Secretary of the Navy, Environment

DENIX— Defense and Environmental Network & eXchange

DEP— Director of Environmental Programs

DoD— Department of Defense

ERDC-CERL— Engineer Research and Development Center, Construction Engineering Research Laboratory

HQ ACC—Headquarters Air Combat Command

HQ AFCEE— Headquarters Air Force Center for Engineering and the Environment

ICRMP— Integrated Cultural Resources Management Plan

IMCOM NE— Installation Management Command Northeast

IMCOM SE— Installation Management Command Southeast

LEED— Leadership in Energy and Environmental Design

LEED-EB— Leadership in Energy and Environmental Design, Existing Buildings

LEED-NC— Leadership in Energy and Environmental Design, New Construction

MCAS—Marine Corps Air Station

MCRD— Marine Corps Recruit Depot

NAGPRA— Native American Graves Protection and Repatriation Act of 1990

NAES— Naval Air Engineering Station

NAS— Naval Air Station

NAVFAC— Naval Facilities Engineering Command

NAVFAC LANT— Naval Facilities Engineering Command Atlantic

NAVAC MidLant— Naval Facilities Engineering Command Mid-Atlantic

NAVAC SE— Naval Facilities Engineering Command Southeast

NAVAC SW— Naval Facilities Engineering Command Southwest

NCSHPO— National Conference of State Historic Preservation Officers

NEPA— National Environmental Policy Act of 1969

NHL— National Historic Landmark

NHPA— National Historic Preservation Act of 1966

NRHP— National Register of Historic Places

OPNAVINST— Chief of Naval Operations Instruction

ORISE— Oak Ridge Institute for Science and Education

OSD— Office of the Secretary of Defense

PA— Programmatic Agreement

PC— Program Comment

ROTC— Reserve Officer's Training Corps

SAF/IE— Secretary of the Air Force (Installation, Environment and Logistics)

SAGE— Semi-Automatic Ground Environment

SECNAVINST— Secretary of Navy Instruction

SHPO— State Historic Preservation Office/Officer

TCP— Traditional Cultural Property

TO— Modified-Theater-of-Operations (standardized plans)

UFC— Unified Facilities Criteria

USAEC— United States Army Environmental Command

USGBC— United States Green Building Council

USMA— United States Military Academy

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CHAPTER 14. DEFINITION OF TERMS

The following architectural terms have been compiled from a variety of sources including The National Historic Preservation Act, "Preservation Terminology" by the National Park Service; Guidelines for Documenting and Evaluating Historic Military Landscapes: An Integrated Landscape Approach *by USACERL; and Department of Defense Dictionary of Military and Associated Terms (website: http://www.dtic.mil/doctrine/jel/doddict/)*

Architectural Integrity—To be eligible for the NRHP under Criterion C, a property must retain most of the physical features that constitute the property's architectural influence or style, or technique. This includes original materials, design, and workmanship.

Contributing Element or Resource—A building, site, structure, or object that adds to the historical associations, historic architectural qualities, or archaeological values for which a property is significant.

Character-defining Feature—A prominent or distinctive aspect, quality, or characteristic of a cultural resource that contributes significantly to its physical character.

Compatible—For historic properties, replacement or new features that are sensitive to the properties' historic character and matches the original feature in items such as material, size, shape, design, scale, color and craftsmanship.

Cultural Landscape—A geographic area including both cultural and natural resources and the wildlife or domestic animals therein associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

Cultural Resource—A building, structure, district, site, object or document that is of significance in American history, architecture, archaeology or culture.

Demolition by Neglect—The destruction of a building through abandonment or lack of maintenance.

Department of the Air Force—Component of DoD responsible with defending the United States borders by way of air supremacy. Established in 1947.

Department of the Army—Component of DoD responsible with the mission of maintaining the ground force readiness. Originally the War Department until changed name in 1947.

Department of the Navy—Component of DoD responsible for defending the United States borders through the control of the oceans.

Design Guidelines—Criteria developed to identify design concerns for historic properties including buildings, sites, districts, objects and landscape to help ensure rehabilitations and new construction respect the character of the historic properties.

Documentary and Physical Evidence—Historic features and details of a historic property are portrayed through historic photographs, works of art, original drawing plans or through physical remainders such as shadow or ghost marks.

DoD—Department of Defense. The federal department responsible for safeguarding national security of the United States and created in 1947.

Element—A physical component of a historic property such as roof, window, column, etc. and can be the subject of a treatment intervention. Also referred to as a feature.

Ethnographic Landscape—A landscape containing a variety of natural and cultural resources that associated people define as heritage resources.

Fabric—The physical material of a building, structure, or community, connoting an interweaving of component parts.

Façade—The exterior face of a building that is the architectural front, sometimes distinguished from the other faces by elaboration of architectural ornamental details. Also referred to as building elevations.

False historical appearance—Creating exact replicas of historic architectural or design features of a building, structure or landscape in which one cannot decipher if it is historic or modern. Also referred to as false sense of history.

Feature—A physical component of a historic property such as street, tree, roof, window, etc. and can be the subject of a treatment intervention. Also referred to as an element.

Historic Building—A building included in, or eligible for inclusion in the NRHP which is significant for its association with a historic event, activity or person. A building is created principally to shelter any form of human activity.

Historic Character—The physical elements of a historic property that contribute to its significance.

Historic Context—A unit created for planning purposes that groups information about historic properties based on a shared theme, specific time period and geographical area.

Historic Designed Landscape—A landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, engineer, or horticulturist according to design principles, or an amateur gardener working in a recognized style or tradition.

Historic District—A geographically definable area with a significant concentration of buildings, structures, sites, spaces or objects unified by past events, physical development, design, setting, materials, workmanship, sense of cohesiveness or related historic and aesthetic associations.

Historic Object—An object included in, or eligible for inclusion in the NRHP which is significant for its association with a historic event, activity or person. Objects are those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed.

Historic Property—Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the NRHP, including artifacts, records, and material remains related to such a property or resource. Also known as a cultural resource.

Historic Site—A site included in, or eligible for inclusion in the NRHP which is significant for its association with a historic event, activity or person. A site is the location of a significant event, prehistoric or historic occupation or activity, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value. A site can be a landscape.

Historic Structure—A structure included in, or eligible for inclusion in the National Register which is significant for its association with a historic event, activity or person. A structure is created for purposes other than creating human shelter.

Historic Vernacular Landscape—A landscape that evolved through use by the people whose activities or occupancy shaped it.

Identify—To determine the original existing features and materials of a historic property.

Integrity—The authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period.

Installation, Military—A military facility in a fixed or relatively fixed location, together with its buildings, building equipment, and subsidiary facility. Also referred to as base, post, camp and station.

Landscape, Historic Military—A landscape that is uniquely shaped in support of a particular military mission and is associated with historically important persons or events, or is an important indicator of the broad patterns of history.

Landscape, Military—A landscape that is uniquely shaped through activities in support of a particular military mission.

Marine Corps—Military service of the Department of the Navy.

Mothballing—The process of closing up a building temporarily to protect it from the weather as well as to secure it from vandalism.

National Historic Landmark—(NHL) Historic property designated by the Secretary of the Interior for having exceptional significance in the nation’s history.

National Historic Preservation Act—(NHPA) Federal law passed in 1966 requiring the consideration of historic properties in the planning and implementation of and use and development of projects.

National Register of Historic Places—(NRHP) A list of properties which are significant in American history and worthy of preservation.

Noncontributing Element or Resource—A building, site, structure or object that does not add to the historical associations, historical architectural qualities or archaeological values for which a property is significant.

Preservation—The act or process of applying measures to sustain the existing form and vegetative cover of a site. It may include stabilization work, where necessary, as well as ongoing maintenance of the historic building materials.

Programmatic Agreement—A program alternative for the Section 106 review process in which a federal agency is allowed to govern the implementation of a particular agency program or the resolution of adverse effects from complex projects or multiple undertakings similar in nature through an agreement between the agency and the Advisory Council for Historic Preservation.

Programmatic Comment—A program alternative for the Section 106 review process in which a federal agency is allowed to request the Advisory Council for Historic Preservation to comment on a category of undertakings in lieu of conducing individual reviews.

Protect—To maintain the status and integrity of the original existing features and materials of a historic property.

Reconstruction—The act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Rehabilitation—The act or process of returning a property to a state of utility through repair or alteration which makes possible an efficient contemporary use while preserving those portions or features of the property which are significant to its historical, architectural, and cultural values.

Renovation—Modernization of an old or historic building that may produce inappropriate alteration or eliminate important features and details.

Repair—A level of intervention for historic properties that is approached by using actions that require the least degree of intervention such as patching, piecing, splicing, consolidating or otherwise repairing a historic feature or material by recognized preservation methods.

Replace—A level of intervention for historic properties that is used when character-defining features are extensively deteriorated or missing, which results in the replacement of the feature(s) based on documentary or physical evidence and the replacement is compatible with the historic property.

Replace in-kind—Replacement of a historic feature of a resource with a new feature that matches the original in material, appearance, size, shape, design, scale, color and craftsmanship.

Restoration—The act or the process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.

Restoration Period—The particular period in which it has been decided to return a historic building to its appearance at that time following the treatment standards for restoration.

Retain—To keep intact the original features and materials of a historic property.

Reuse—The use of a material more than once in its same form for the same purpose.

Section 106—The provision of the National Historic Preservation Act of 1966 that requires the head of a federal agency financing or licensing a project to make a determination of the effect of the project of a property on or eligible for the NRHP.

State Historic Preservation Office/Officer—State agency responsible with administering the cultural resources program within in their state or territory, director of the program is referred to as the State Historic Preservation Officer and he/she is appointed by the governor of each state and territory.

Significance—The meaning or value ascribed to a cultural resource based on the NRHP criteria for evaluation.

Stabilization—The act or process of applying measures designed to re-establish a weather resistant enclosure and the structural stability to unsafe or deteriorated property while maintaining the essential form as it exists at present.

Streetscape—The distinguishing character of a particular street which is created by its width, degree of curvature, paving materials, design of street furniture, forms of surrounding buildings, and the presence of vegetation along the curb or sidewalk.

Substitute Materials—Those products used to imitate historic materials, which should match the appearance and physical properties of historic materials.

Treatment—Work carried out to achieve a particular historic preservation goal. Four types of treatment: Preservation, Restoration, Reconstruction and Rehabilitation.

Undertaking—A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including:

(A) those carried out by or on behalf of the agency;

(B) those carried out with Federal financial assistance;

(C) those requiring a Federal permit license, or approval; and

(D) those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency.

Viewshed—The natural or built environment that is visible from one or more viewing points.

CHAPTER 15. GLOSSARY OF ARCHITECTURAL TERMS

The following architectural terms have been compiled from a variety of sources including Landmark Yellow Pages *by the National Trust for Historic Preservation; "Glossary of Architectural Terms" by John C. Waters and the National Alliance of Preservation Commissions;* Design Guidelines for Raleigh Historic Districts *by the Raleigh Historic District Commission;* An Illustrated Glossary of Early Southern Architecture and Landscape *edited by Carl R. Lounsbury; and* Guidelines for Documenting and Evaluating Historic Military Landscapes *by USACERL. *For additional definitions regarding military terms please consult the Department of Defense Dictionary of Military and Associated Terms (website: http://www.dtic.mil/doctrine/jel/doddict/)*

Adaptive Reuse—The process of converting a building to a use other than that for which it was designed.

Aluminum Siding—Sheets of exterior architectural covering, usually with a colored finish, fabricated of aluminum to approximate the appearance of wooden siding. Aluminum siding was developed in the early 1940s and became increasingly common in the 1950s and the 1960s.

Aqua-media—A roof which continued around all four sides just above the ground story windows. A typical feature of WWII temporary buildings of the 700 Series. Also referred to as a skirt roof.

Arcade—A series of arches supported on columns or square or rectangular piers; or a covered passageway whose sides are open arcades.

Arch—A structure formed of wedge-shaped stones, bricks, or other objects laid so as to maintain one another firmly in position.

Architrave—The lowest element in the entablatures of the Ionic and Corinthian columnar orders.

Armory—1) A place for storing weapons and equipment, 2) a factory for making arms, 3) an arsenal.

Arsenal—1) an installation where weapons, ammunition and other military materiel is made, repaired and stored, 2) an armory but without drill facilities, 3) a stock of weapons.

Art Deco—A style of decorative arts and architecture popular in the 1920s and 1930s, characterized by its use of geometric, angular forms. Also referred to as Moderne or Art Moderne.

Asbestos Siding or Shingles—Dense, rigid board containing a high proportion of asbestos fibers bonded with portland cement; resistant to fire, flame, or weathering and having a low resistance to heat flow. It is usually applied as large overlapping shingles. Asbestos siding was applied to many buildings in the 1950s.

Ashlar—A dressed or squared stone and the masonry built of such hewn stone.

Asphalt Shingle—A shingle manufactured from saturated roofing felts (rag, asbestos, or fiberglass) coated with asphalt and finished with mineral granules on the side exposed to weather.

Asphalt Siding—Siding manufactured from saturated construction felts (rag, asbestos, or fiberglass) coated with asphalt and finished with mineral granules on the side exposed to weather. It sometimes displays designs seeking to imitate brick or stone. Asphalt siding was applied to many buildings in the 1950s.

Asymmetry—Building's façade lacks balance or symmetry.

Attic Ventilator—In houses, a screened or louvered opening, sometimes in decorative shapes, located on gables or soffits. Victorian styles sometimes feature sheet soffits or metal ventilators mounted on the roof ridge above the attic.

Awning—A roof-like covering of canvas, often adjustable, over a window, a door, etc., to provide protection against sun, rain, and wind. Aluminum awnings were developed in the 1950s.

Balcony—A platform enclosed with a low parapet, railing or balustrade and projecting from a wall usually in front of a window or other opening.

Baluster—A turned or rectangular upright supporting a stair handrail or forming part of a balustrade.

Balustrade—An entire railing system including a top rail and its balusters and often a bottom rail.

Band (also known as Band Course, Bandmold, Belt)—Flat trim running horizontally in the wall to denote a division in the wall plane or a change in level.

Bargeboard—A board, often ornately curved, attached to the projecting edges of a gabled roof. Also referred to as vergeboard.

Barrack—Buildings used for housing military personnel often used to specifically designate housing for enlisted personnel, in distinction from separate quarters in which officers and noncommissioned officers live.

Barrel Roof—A roof of semi-cylindrical section.

Bay—One unit of a building that consists of a series of similar units; commonly defined as the number of vertical divisions within a building's façade (e.g. windows and door openings or the areas between the columns or piers.

Bay Window—A large window or series of windows projecting from the outer wall of a building and forming a recess within.

Belt Course—A narrow horizontal band projecting from the exterior walls of a building, usually defining the location of interior floor levels.

Beveled Glass—Glass panes whose edges are ground and polished at a slight angle so that patterns are created when panes are set adjacent to one another.

Blinds—External or internal louvered wooden shutters on windows or doors that exclude direct sunlight but admit light when the louvers are raised.

Blind Arch—An arch that does not contain an opening for a window or door but is set against or indented within a wall.

Blockhouse—A defensive structure of heavy timbers or other substantial material with small openings or loopholes for observation and for firing weapons.

Board and Batten—Closely applied vertical boards, the joints of which are covered by vertical narrow wooden strips.

Bond—The laying of bricks or stones regularly in a wall according to a recognized pattern for strength. Masonry bond is essential to brickwork when wire reinforcement is not used.

Boxed Eaves—Enclosed eaves with boards nailed to form a fascia and soffit, sometimes enriched by moldings.

Brace—A diagonal stabilizing member of a building frame.

Bracket—A projecting support used under cornices, eaves, balconies, or windows to provide structural or purely visual support.

Buttress—A vertical mass of masonry projecting from or built against a wall to give additional strength at the point of maximum stress.

Cantilever—A bracket or horizontal beam whose length is greater than its breadth and that projects out beyond the wall to support a balcony, pediment or entablature.

Cantonment—1) A group of temporary structures used for housing troops, 2) a military post or camp.

Capital—The uppermost part, or head, of a column or pilaster.

Casement —A hinged window frame that opens horizontally like a door.

Casing—The exposed trim molding, framing, or lining around a door or a window; may be either flat or molded.

Castellated—Having a battlemented or crenulated parapet or roof.

Cast iron—Iron that has been shaped by being melted and cast in a mold.

Caulking—A resilient mastic compound, often having a silicone, bituminous, or rubber base; used to seal cracks, fill joints, prevent leakage, and/or provide waterproofing.

Casement—A hinged window frame that opens horizontally like a door.

Chalking—The formation of a powder surface condition from the disintegration of a binder or an elastomer in a paint coating; caused by weathering or an otherwise destructive environment.

Chamfer—A beveled edge or corner.

Chamfered Post—A square post with the edges of its corners cut away or beveled.

Checking—Small cracks in a film of paint or varnish that do not completely penetrate to the previous coat; the cracks are in a pattern roughly similar to a checkerboard.

Chimney—A structure that rises above a roof to allow the passage of smoke and gases to escape from a fireplace or furnace.

Chimney Pot—A pipe placed on top of a chimney, usually of earthenware, which functions as a continuation of the flue and improves draft.

Cladding—A material used to cover the outer walls of frame structures. Also known as siding.

Clapboard—A long, narrow board with one edge thicker than the other, overlapped to cover the outer walls of frame structures, also known as weatherboard.

Classical—A loose term to describe the architecture of ancient Greece and Rome and later European offshoots, the Renaissance, Baroque, and Rococo styles. In the United States, classical embraced Georgian, Federal, Greek Revival, and Renaissance Revival (or Neoclassical).

Clerestory—Windows located relatively high up in a wall that often tend to form a continuous band.

Clipped Gable—A gable roof of which the peak is truncated for decorative effect, often the roof overhangs the missing peak.

Column—A round, vertical support, in classical architecture the column consists of three parts: base, shaft and capital.

Colonnette—A small scale column, generally employed as a decorative element on mantels, overmantels and porticos.

Colonial Architecture—Architecture transplanted from the motherlands to overseas colonies.

Column—A vertical shaft or pillar that supports or appears to support a load.

Common Bond—A method of laying brick wherein one course of headers is laid for every three, five, or seven courses of stretchers.

Composition board—A building board, usually intended to resemble clapboard, fabricated from wood or paper fabric under pressure and at an elevated temperature, usually with a binder.

Coping—The cap or the top course of a masonry wall.

Corbel—1)In masonry, a projection or one of a series of projections, each stepped progressively farther forward with increasing height, anchored in a wall, story, column or chimney; 2) A bracket or block projecting from the face of a wall that generally supports a cornice, beam or arch.

Corinthian Order—The most slender and ornate of the classical Greek orders of architecture, characterized by a slim fluted column with bell-shaped capital decorated with stylized acanthus leaves.

Corner block—A block placed at a corner of the casing around a wooden door or window frame, usually treated ornamentally.

Corner board—One of the narrow vertical boards at the corner of a traditional wooden frame building, into which the clapboards butt.

Cornice—1) A molding at the edge of a roof; 2) A molding that covers the angle formed by ceiling and wall; 3) The uppermost section of an entablature.

Couple Columns—Columns set as close parts with a wider intercolumnation (the clear space) between the pairs.

Course—A horizontal row of stones or bricks in a wall.

Cresting—An openwork ornament along a horizontal edge or ridge.

Crenulation—Alternating indentations and raised sections of a parapet, creating a tooth-like profile sometimes known as a battlement.

Cross-gable Roof—Where one gable-ending roof intersects another gable-ending roof.

Crown—A decorative crown is something curved to form a half circle, top, or chief ornament.

Cupola—A small vault on top of a roof; sometimes spherical in shape, sometimes square with a mansard or conical roof.

Deck—An uncovered porch, usually at the rear of a building; popular in modern residential design.

Dentil—A small rectangular block used in a series below the cornice in the Ionic, Corinthian, and Composite orders, and sometimes the Doric.

Depot—A facility, often an installation, for the receipt, storage, issue, maintenance, manufacture, assembly or salvage of supplies or the reception, processing, training and assignment of personnel.

Door—A panel or barrier, usually hinged, sliding, or electronic, that is used to cover an opening in a wall or partition going into a building or space.

Doric Order—A classical order characterized by simple unadorned capitals supporting a frieze of vertically grooved tablets or triglyphs set at intervals.

Dormer Window—An upright window lighting the space in a roof; when it is in the same place as the wall, it is called a wall dormer, when it rises from the slope of the roof, a roof dormer.

Double Door—An opening with two vertical doors that meet in the middle of the opening when closed, also called double-leaf.

Double-hung sash window—A window with two sash, one above the other, arranged to slide vertically past each other.

Double-leaf—An opening with two vertical doors that meet in the middle of the opening when closed, also called double door.

Downspout—A vertical pipe, often of sheet metal, used to conduct water from a roof drain or gutter to the ground or a cistern.

Dressed—Descriptive of stone, brick, or lumber that has been prepared, shaped, or finished by cutting, planing, rubbing, or sanding one or more of its faces.

Drip Molding—Molding that has a projecting edge that is channeled beneath to prevent water from running back against the surface of a wall.

Eave—The part of a sloping roof that projects beyond a wall.

Eclectic or Eclecticism—A method of design in architecture in which elements from a variety of stylistic sources are selected and combined in new and original ways.

Elevation—A drawing showing the vertical elements of a building, either exterior or interior, as a direct projection to a vertical plane.

Engaged Porch—A porch the roof of which is continuous structurally with that of the main section of the building.

English Bond—A method of laying brick wherein one course is laid with stretchers and the next with headers, thus bonding the double thickness of brick together and forming a high-strength bond of alternating courses of stretchers and headers.

Entablature—The horizontal part of an architectural order, supported on columns, composed of architrave, frieze and cornice.

Escutcheon—A protective plate, sometimes decorated, surrounding the keyhole of a door, a light switch, or a similar device.

Etched Glass—Glass whose surface has been cut away with a strong acid or by abrasive action into a decorative pattern.

Exterior End Chimney—A chimney located outside the walls of a building, usually against the gable end of a building.

Façade—The exterior face of a building that is the architectural front, sometimes distinguished from the other faces by elaboration of architectural ornamental details.

Fanlight—A window, often semi-circular, over a door with radiating muntins suggestive of a fan.

Fascia—A flat board with a vertical face that forms the trim along the edge of a flat roof, or along the horizontal, or eave side of a pitched roof. The rain gutter is often mounted on it.

Fenestration—The windows and doors and their openings in a building.

Finial—A formal ornament at the top of a canopy, gable, pinnacle, streetlight, etc.

Firing Range (artillery range)—An area equipped with targets to practice firing.

Flared Eaves—An eave that projects upward.

Flashing—A thin impervious material placed in construction to prevent water penetration, to provide water drainage, or both, especially between a roof and a wall.

Flat Arch—An arch formed on a straight horizontal plane. Also known as jack arch.

Flemish Bond—A method of laying brick wherein headers and stretchers alternate in each course and vertically, headers are placed over stretchers to form a bond and give a distinctive cross pattern.

Flush Siding—Wooden siding that lies on a single plane; commonly applied horizontally except when applied vertically to accent an architectural feature.

Fluting—A system of vertical grooves (flutes) in the shaft of an Ionic, Corinthian, or Composite column. Doric columns have portions of the cylindrical surface of the columns separating the flutes.

Foil—A rounded or leaf like ornament found in windows, niches, etc.

Fort—1) a strong or fortified structure that is protected by wall and ditches; 2) permanent United States Army installation or garrison.

Fortress—A fortified place generally larger than a fort and often including a town within its fortified perimeter.

Foundation—The supporting portion of a structure below the first-floor construction, or below grade, including footings.

French window—A long window reaching to floor level and opening in two leaves like a pair of doors.

Fretwork—A geometrically meandering strap pattern; a type of ornament consisting of a narrow fillet or band that is folded, crossed, and interlaced.

Frieze—The intermediate member of a classical entablature, usually ornamented; also a horizontal decorative panel.

Front-gable Roof—A double sloping roof (gable) with the front entry located on triangular shape side.

Gable—The vertical triangular shape at the end of a building formed by a double sloping roof.

Gable-on-hip—A hipped roof in which the hips are not carried all the way to the ridge; instead, each end roof surface turns vertically near the top so as to form a small gable that is perpendicular to the ridge.

Galvanize—To coat steel or iron with zinc, as, for example, by immersing it in a bath of molten zinc.

Garland—A curved hanging festoon of leaves or flowers uses as an applied ornamental device.

Glazing—Setting glass in an opening; the glass surface of a glazed opening.

Gambrel Roof—A gable roof more or less symmetrical, having four inclined surfaces, the pair meeting at the ridge having a shallower pitch.

Garrison—1) all units assigned to a base or area of defense, development, operation and maintenance of facilities; 2) a military post.

German Siding—Wooden siding with a concave upper edge that fits into a corresponding rabbet in the siding above.

Gingerbread—Thin, curvilinear ornamentation produced with machine-powered saws.

Glazed Header—A brick having a glossy, dark coating ranging in color from gray green to almost black, formed on the outer surface through direct exposure to flame and intense heat during firing process. In Flemish bond brickwork, often used for decorative purposes by laying the brick so the glazed headers form a pattern in the wall.

Glue-Chip Glass—A patterned glass with a surface resembling frost crystals.

Gutter—A shallow channel of metal or wood set immediately below or built in along the eaves of a building to catch and carry off rainwater.

Half–glazed Door—A door consisting of glazing or windows and panels.

Half-timbering—Constructed of wood framing with spaces filled with masonry.

Hangar—A large building with extensive floor area, typically for housing aircraft.

Header—A brick laid across the thickness of a wall to bond together different widths of a wall; the exposed end of a brick.

Hipped Roof—A roof without gables, each of whose sides, generally four, lies in a single plane and joins the others at an apex or ridge.

Hood—A projecting molding above a door, window and archway to throw off rain.

I-house—A vernacular house form consisting of two stories with a central hallway and one room deep.

Interior End Chimney—A chimney positioned on the interior side of the gable end of a building.

Jack Arch—An arch formed on a straight horizontal plane. Also known as flat arch.

Jamb—The vertical sides of an opening, usually for a door or a window.

Jerkin Head Roof—A roof whose end has been formed into a shape midway between a gable and a hip, resulting in a truncated or “clipped” appearance; sometimes called clipped gable.

Joist—One of a series of parallel timbers or beams, usually set on edge, that span a room from wall to wall to support a floor or ceiling.

Keystone—The central voussoir of an arch shaped in a wedge form.

Knee brace—A non-structural, diagonal member used as exterior ornamentation, extending from the façade to the eave of a building.

Landscape—The surface features of a place and the spatial relationship among those features including natural terrain, human affected terrain and the built environment.

Landscape characteristics—The tangible evidence of the activities and habits of the people who occupied, developed, used and shaped the land to serve human needs; they may reflect the beliefs, attitudes, traditions and values of the people.

Landscape components—The physical elements of landscape that in combination define its characteristics such as circulation networks, boundary demarcations, vegetation, buildings and structures.

Latex paint—A paint having a latex binder (an emulsion of finely dispersed particles of natural or synthetic rubber or plastic materials in water).

Lattice—A network, often diagonal, of interlocking lath or other thin strips used as screening, especially in the base of a porch.

Ledge—A shelf, often supported by brackets, attached to the edge of a vertical member such as a panel.

Light—A section of a window, the pane or glass. See also pane.

Lintel—A horizontal structural or ornamental member over an opening that generally carries the weight of the wall above it, often of stone or wood.

Lunette—A semicircular opening.

Mansard roof—A modification of the hipped roof in which each side has two planes, the upper being more shallow.

Massing—The physical volume or bulk of a building.

Mildew—A fungus that grows and feeds on paint, cotton and linen fabrics, etc., that are exposed to moisture; causes discoloration and decomposition of the surface.

Modillion—A horizontal bracket, often in the form of a plain block, ornamenting or sometimes supporting the underside of a cornice.

Molding—A decorative band having a constant profile or having a pattern in low relief, generally used in cornices or as trim around openings.

Mortar—A mixture of portland cement, lime, putty, and sand in various proportions, used for laying bricks or stones. Until the use of hard portland cement became general, the softer lime-clay or lime-sand mortars and masonry cement were common.

Mortise and Tenon Joint—A woodworking joint that is made by one member having its end cut in a projecting piece (tenon) that fits exactly into a groove or hole (mortise) in the other member. Once joined the pieces are held together by a peg that passes through the tenon.

Motif—A design or figure that consists of recurring shapes or colors in architecture or decoration.

Mullion—A vertical member separating windows, doors or panels set in a series.

Muntin—1) A secondary framing member to hold panes within a window, window wall, or glazed door; 2) An intermediate vertical member that divides the panels of a door.

Newel Post—A tall and more or less ornamental post of the head or foot of a stair, supporting the handrail.

Ogee—A double curve formed by the combination of a convex and concave line, similar to an s-shape.

Oil Paint—A paint in which a drying oil, usually linseed oil, is the vehicle for the pigment; rarely used as a house paint since the mid-twentieth century when it was commonly replaced by alkyd resin paints.

Oriel Window—1) A bay window projecting from an upper story; 2) A subsidiary bay or a corbelled, enclosed feature either exterior or interior.

Palladian Window—A window design featuring a central arch opening flanked by lower square-headed openings separated by columns, pilasters, piers or narrow vertical panels.

Pane—A framed section of a window or door that is usually filled with a sheet of glass or other transparent material. See also light.

Panel—A thin, flat piece of wood framed by stiles and rails as in a door or fitted into grooves of thicker material with molded edges for decorative wall treatment.

Pantile—A roofing tile that has the shape of an S laid on its side.

Parade Ground—A large, flat expanse of land, usually covered with mowed turf grass where troops march in review.

Parapet—1) A wall section rising above the roofline; 2) A low wall, sometime battlemented, placed to protect any spot where there is a sudden drop.

Pavilion—A wing or central unit which projects from a larger architectural unit and is usually accented by special decorative treatment.

Pediment—A triangular gable bounded on all sides by a continuous cornice.

Pilaster—A flat-faced representation of a column, projecting from a wall.

Pitch—The angle of a roof, or the proportion between the height and the span of the roof.

Pointed Arch—An arch with a pointed apex.

Polychromatic—The use of many colors in decoration.

Porch—An exterior appendage to a building, forming a covered approach or vestibule to a doorway.

Porte Cochere—A large covered entrance porch through which vehicles can pass.

Portico—A small entrance porch or covered walk consisting of a roof supported by open columns.

Portland cement—A very hard and strong hydraulic cement (one that hardens under water) made by heating a slurry of clay and limestone in a kiln.

Post and Lintel—A structural system in which the main support is provided by vertical members, or posts, carrying horizontal members called lintels.

Pressed metal—Thin sheets of metal molded into decorative designs and used to cover interior walls and ceilings.

Primer—A paint applied as a first coat that serves the function of sealing and filling on wood, plaster, and masonry.

Projection—A section of a building that extends outward from the surface, either vertically or horizontally.

Quarter round—A small molding that has the cross-section of a quarter circle.

Quatrefoil window—A round window which is composed of four equal lobes, like a four-petaled flower.

Quoins—Heavy blocks, generally of stone or wood, cut in emulation of stone and used at the corners of buildings to reinforce and ornament masonry walls, or in wood as a decorative feature only.

Rafters—Structural timbers rising from the plate at the top of a wall to the ridge of the roof and supports the roof covering.

Rafter Ends—The ends of structural timbers rising from the plate at the top of a wall to the ridge of the roof (rafters) which can be exposed. Sometimes also referred to as rafter tails.

Rail—The horizontal cross pieces of a door.

Railing—A structure made of rails and upright members that is used as a guard or barrier or for support. Also known as balustrade.

Raised Basement—The substructure or foundation of a building that is raised above ground rather than underground.

Raised Panels—A portion of a flat surface, as in the panel of a door or wainscoting, that is distinctly set off from the surrounding area by a molding or other device and is raised above the surrounding area.

Rake—Trim members that run parallel to a roof slope and form the finish between the wall and a gable roof extension.

Recessed Light—A light that has been placed into a surface so that its face is flush with the surface of a ceiling or a wall.

Repointing—Raking out deteriorated mortar joints and filling with a surface mortar to repair the joint.

Ribbon—One of a horizontal series of three windows or more, separated only by mullions, that form a horizontal band across the facade of a building.

Riser—The vertical part of a step or stair.

Roof—The covering of a building, including the framing or other structural elements as well as the sheathing or roof material.

Roof Line—The top edge of a roof.

Roofing Tile—A tile for roofing, usually of burnt clay; available in many configurations and types, such as plain tiles, single-lap tiles, and interlocking tiles.

Roof Types—The form and shape of a roof such as hip, mansard, shed and side-gabled.

Rustification—The treatment of stone masonry that deeply cuts back the joints between the blocks. The surfaces of the blocks may be smoothly dressed, textured, or extremely rough or quarry-faced.

Sandblasting—An extremely abrasive method of cleaning brick, masonry, or wood that involves directing high-powered jets of sand against a surface. Sanding, flattening down, rubbing -- smoothing a surface with abrasive paper or cloth, either by hand or by machine.

Sash—A window frame that opens by sliding up or down.

Sawnwork—Ornamentation in cutout planking, formed with a bandsaw. Popular in the 1880s and the 1890s, this decorative detailing is flat.

Segmental arch—An arch formed on a segment of a circle or an ellipse.

Sheet metal—A flat, rolled-metal product, rectangular in cross-section and form; when used as roofing material, usually terne- or zinc-plated.

Shingle—A roofing unit of wood, asphalt, slate, tile, or other material cut to stock lengths, widths, and thicknesses; used as an exterior covering on roofs and applied in an overlapping fashion.

Shoulder—The sloping shelf or ledge created on the side of a masonry chimney where the width of the chimney changes.

Shutters—Small wooden louvered or solid panels hinged on the exterior of windows, and sometimes doors, to be operable.

Side-gable Roof—A double sloping roof (gable) with the front entry located on the non-triangular shape side.

Sidelights—A vertical line of small glass panes flanking a doorway.

Sill—The lowest horizontal member in a wall opening.

Soffit—The exposed undersurface of any overhead component of a building, such as an arch, balcony, beam, cornice, lintel, or vault.

Spindlework—Intricate woodwork or trim; sometimes referred to as gingerbread.

Spire—A conical, sharp-pointed termination to an object.

Stepped gable—A gable concealing the end of a roof with a stepped parapet.

Stile—The vertical crosspieces of a door.

Street furniture—Equipment placed along streets including light fixtures, fire hydrants, police and fire call boxes, signs, benches and kiosks.

Stretcher—A brick or a stone laid with its length parallel to the length of the wall.

Strings—The two sloping members that carry the ends of the treads and risers of a staircase.

String course—A projecting course of bricks or other material forming a narrow horizontal strip across the wall of a building, usually to delineate the line between stories. Also referred to as a belt course.

Stucco—An exterior finish, usually textured, composed of portland cement, lime, and sand mixed with water. Older-type stucco may be mixed from softer masonry cement rather than portland cement.

Surround—The molded trim around a door or window opening.

Swag—A suspended festoon of drapery, frequently used in combination with the garland as an applied ornamental device.

Symmetry—Building's façade corresponds in size, shape, and relative position of parts on opposite sides of a dividing line or axis (usually a center axis).

Tarpaper—A roofing material manufactured by saturating a dry felt with asphalt and then coating it with a harder asphalt mixed with a fine material.

Terneplate—Sheet metal coated with terne metal, which is an alloy of lead containing up to 20 percent tin.

Terra Cotta—A fine-grained, brown-red clay used for roof and floor tiles and decoration.

Textured siding—Wood cut in various flat patterns, such as half-rounds or scallops, and applied to portions of facades to create a picturesque or romantic look. Surface textures are often found in diamond, scallop, staggered butt, or composite patterns.

Three-part Window—A window having a wide rectangular sash at its center and a narrower sash on each side. Also referred to as a Palladian window.

Tongue and Groove—A joinery system in which boards are milled with a tongue on one side and a groove on the other so that they can be tightly joined with a flush surface alignment.

Tower—A vertical projection.

Trabeated Entrance—A standard classical entrance featuring an over door light and sidelights.

Tracery—An ornamental division of an opening, especially a large window, usually made with wood.

Transom—A light or window over a door or entranceway.

Tread—The horizontal surface of a step.

Triglyph—The characteristic ornament of the Doric frieze, consisting of slightly raised blocks of three vertical bands separated by V-shaped grooves.

Trim—The finish material on a building, such as moldings applied around openings or at the floors and the ceilings of rooms.

Truss—A rigid triangular framework consisting of chords, struts, other supporting members.

Turret—A small tower, usually corbelled from a corner.

Veranda, verandah—A covered porch or balcony extending along the outside of a building.

Vergeboard—A board, often ornately curved, attached to the projecting edges of a gabled roof. Also referred to as bargeboard.

Vinyl Siding—Sheets of thermal plastic compound made from chloride or vinyl acetates, as well as some plastics made from styrene and other chemicals, usually fabricated to resemble clapboard.

Visor Roof—Narrow roof segments cantilevered from the wall.

Water-blasting—A cleaning method similar to sandblasting except that water is used as the abrasive. As in sandblasting, high-pressure water jets become an abrasive force that can damage wood and masonry surfaces.

Water Table—A belt course differentiating the foundation of a masonry building from its exterior walls.

Weatherboard—Wooden clapboard siding.

Window—An opening that allows the passage of light and, if not closed or sealed, air and sound, which are usually glazed or covered in some other transparent or translucent material.

Window Frame—The structure of a window opening,.

Wing—A part of a building projecting on one side or behind, or a separate, detached structure flanking the central or main section.

Wrought Iron—Iron that is rolled or hammered into shape, never melted.

CHAPTER 16. SOURCES FOR TECHNICAL ASSISTANCE

The presence of hyperlinks to websites outside of DoD does not constitute an endorsement of the information contained therein.

Department of Defense

Defense Environmental Network & Information eXchange (DENIX), Environment, Conservation, Cultural Resources (PUBLIC MENU)
Website: https://www.denix.osd.mil/portal/page/portal/denix/environment/CR

Department of Defense Legacy Resource Management Program
Website: http://www.dodlegacy.org/Legacy/intro/guidelines.aspx

Office of the Deputy Under Secretary of Defense (Installations and Environment)
Website: http://www.acq.osd.mil/ie/

Department of the Air Force

Air Force Historical Research Agency
Website: http://afhra.maxwell.af.mil/

Secretary of the Air Force (Installations, Environment and Logistics)
Website: http://www.safie.hq.af.mil/

The Air Force Center for Engineering and Environment
Website: http://www.afcee.brooks.af.mil/

Department of the Army

Office of the Assistant Secretary of the Army for Installations and Environment
Website: http://www.asaie.army.mil/Public/IE/default.html

United States Army Center of Military History
Website: http://www.history.army.mil/index.html

Unites States Army Corps of Engineers, Center of Expertise for the Preservation of Historic Buildings and Structures
Website: http://www.nws.usace.army.mil/

United States Army Environmental Command, Cultural Resources
Website: http://aec.army.mil/usaec/cultural/index.html

United States Army Environmental Command, Tech Info
Website: http://www.hnd.usace.army.mil/techinfo/

United States Army Heritage and Education Center
Website: http://www.carlisle.army.mil/ahec/

Department of the Navy

Commandant of the Marine Corps, Installations and Logistics
Website: http://www.marines.mil/units/hqmc/Pages/default.aspx

Deputy Assistant of the Secretary of the Navy, Environment
Website: http://www.hq.navy.mil/IE/DASNE.htm

Naval Facilities Engineering Command
Website: https://portal.navfac.navy.mil/

Naval Historical Center
Website: http://www.history.navy.mil/

Other Federal Agencies

Advisory Council for Historic Preservation
Website: http://www.achp.gov/

General Services Administration, Technical Preservation Guidelines
Website: http://www.gsa.gov/Portal/gsa/ep/contentView.do?programId=9116&channelId=-15162&ooid=14981&contentId=14985&pageTypeId=8195&contentType=GSA_BASIC&programPage=%252Fep%252Fprogram%252FgsaBasic.jsp&P=PMHP

National Archives and Records Administration
Website: http://www.archives.gov/

National Center for Preservation Technology & Training, National Park Service
Website: http://www.ncptt.nps.gov/

National Park Service, Archaeology Program
Website: http://www.nps.gov/archeology/sites/FEDARCH.HTM

National Park Service, History and Culture
Website: http://www.nps.gov/history/

National Park Service, Historic Landscape Initiative
Website: http://www.nps.gov/history/HPS/hli/index.htm

National Park Service, National Register of Historic Places
Website: http://www.nps.gov/nr/

U.S. Department of the Interior
Website: http://www.doi.gov/

National Non-profit Preservation Organizations

National Conference of State Historic Preservation Officers
Website: http://www.ncshpo.org/

National Preservation Institute
Website: http://www.npi.org/

National Trust for Historic Preservation
Website: http://preservationnation.org

The Alliance for Historic Landscape Preservation
Website: http://www.ahlp.org/

The Association for Preservation Technology International
Website: http://www.apti.org/

The Cultural Landscape Foundation
Website: http://www.tclf.org/

The Society of American Military Engineers (SAME)
Website: http://www.same.org/

Other

Center for Environmental Management of Military Lands (CEMML), Colorado State University
Website: http://www.cemml.colostate.edu/

Oak Ridge Institute for Science and Education (ORISE)
Website: http://orise.orau.gov/

Whole Building Design Guide
Website: http://www.wbdg.org/index.php

Standards and Guidelines

The Secretary of the Interior's Standards provide information regarding the proper treatment of historic properties and additional guidelines for specific work on historic buildings.

The Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties, 1992.
Website: http://www.nps.gov/history/hps/tps/standguide/

The Secretary of the Interior's Standards and Guidelines for Rehabilitation, codified as 36 CFR 67, 1990.
Website: http://www.nps.gov/history/hps/tps/standguide/rehab/rehab_index.htm

The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings. W. Brown Morton III, Gary L. Hume, Kay D. Weeks & H. Ward Jandl, U.S. Department of the Interior, National Park Service, 1992.
Website: http://www.nps.gov/history/hps/tps/tax/rhb/

The Secretary of the Interior's Standards and Guidelines for Preservation, codified as 36 CFR 67, 1990.
Website: http://www.nps.gov/history/hps/tps/standguide/preserve/preserve_standards.htm

The Secretary of the Interior's Standards and Guidelines for Reconstruction, codified as 36 CFR 67, 1990.
Website: http://www.nps.gov/history/hps/tps/standguide/reconstruct/reconstruct_index.htm

The Secretary of the Interior's Standards and Guidelines for Restoration, codified as 36 CFR 67, 1990.
Website: http://www.nps.gov/history/hps/tps/standguide/restore/restore_index.htm

The Secretary of the Interior's Standards for the Treatment of Historic Properties with Illustrated Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings. Kay D. Weeks and Anne E. Grimme. U.S. Department of the Interior, National Park Service, 1995.

The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. Charles A. Birnbaum (ed)., U.S. Department of the Interior, National Park Service, 1996.
Website: http://www.nps.gov/history/HPS/hli/landscape_guidelines/index.htm

Preservation Briefs

Preservation Briefs is an on-going series of technical publications prepared by the Technical Preservation Services Division of the National Park Service. *Preservation Briefs* are listed in numerical order.
Main Website: http://www.nps.gov/history/hps/tps/briefs/presbhom.htm

Preservation Briefs 01: ***Assessing Cleaning and Water-Repellent Treatments*** *for Historic Masonry Buildings*. Robert C. Mack, AIA, 1975.
Website: http://www.nps.gov/history/hps/tps/briefs/brief01.htm

Preservation Briefs 02: ***Repointing Mortar Joints*** *in Historic Masonry Buildings.* Robert C. Mack, AIA, de Teel Patterson Tiller and James S. Askins, 1980.
Website: http://www.nps.gov/history/hps/tps/briefs/brief02.htm

Preservation Briefs 03: ***Conserving Energy*** *in Historic Buildings.* Baird M. Smith, AIA, 1978.
Website: http://www.nps.gov/history/hps/tps/briefs/brief03.htm

Preservation Briefs 04: ***Roofing*** *for Historic Buildings.* Sarah M. Sweetser, 1978.
Website: http://www.nps.gov/history/hps/tps/briefs/brief04.htm

Preservation Briefs 05: The Preservation of Historic ***Adobe*** *Buildings.* Technical Preservation Services Division, 1978.
Website: http://www.nps.gov/history/hps/tps/briefs/brief05.htm

Preservation Briefs 06: ***Dangers of Abrasive Cleaning*** *to Historic Buildings.* Anne E. Grimmer, 1979.
Website: http://www.nps.gov/history/hps/tps/briefs/brief06.htm

Preservation Briefs 07: The Preservation of Historic ***Glazed Architectural Terra-Cotta****.* de Teel Patterson Tiller, 1979.
Website: http://www.nps.gov/history/hps/tps/briefs/brief07.htm

Preservation Briefs 08: ***Aluminum and Vinyl Siding*** *on Historic Buildings: The Appropriateness of Substitute Materials for Resurfacing Historic Wood Frame Buildings.* John H. Myers, revised by Gary L. Hume, 1984.
Website: http://www.nps.gov/history/hps/tps/briefs/brief08.htm

Preservation Briefs 09: The Repair of Historic ***Wooden Windows****.* John H. Myers, 1981.
Website: http://www.nps.gov/history/hps/tps/briefs/brief09.htm

Preservation Briefs 10: ***Exterior Paint Problems*** *on Historic Woodwork.* Kay D. Weeks and David W. Look, AIA, 1982.
Website: http://www.nps.gov/history/hps/tps/briefs/brief10.htm

Preservation Briefs 11: Rehabilitating Historic ***Storefronts****.* H. Ward Jandl, 1982.
Website: http://www.nps.gov/history/hps/tps/briefs/brief11.htm

Preservation Briefs 12: The Preservation of Historic Pigmented ***Structural Glass*** *(Vitrolite and Carrara Glass).* Cultural Resources Division, Rocky Mountain Regional Office, 1984.
Website: http://www.nps.gov/history/hps/tps/briefs/brief12.htm

Preservation Briefs 13: The Repair and Thermal Upgrading of Historic ***Steel Windows****.* Sharon C. Park, AIA, 1984.
Website: http://www.nps.gov/history/hps/tps/briefs/brief13.htm

Preservation Briefs 14: ***New Exterior Additions*** *to Historic Buildings: Preservation Concerns.* Kay D. Weeks, 1986.
Website: http://www.nps.gov/history/hps/tps/briefs/brief14.htm

Preservation Briefs 15: Preservation of Historic ***Concrete****: Problems and General Approaches.* William B. Coney, AIA, 1987.
Website: http://www.nps.gov/history/hps/tps/briefs/brief15.htm

Preservation Briefs 16: The Use of ***Substitute Materials*** *on Historic Building Exteriors.* Sharon C. Park, AIA, 1988.
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Website: http://www.nps.gov/history/hps/tps/briefs/brief18.htm

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Preservation Briefs 20: The Preservation of Historic ***Barns.*** Michael J. Auer, 1989.
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*Preservation Briefs 21: Repairing Historic **Flat Plaster** - Walls and Ceilings.* Marylee MacDonald, 1989.
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*Preservation Briefs 22: The Preservation and Repair of Historic **Stucco**.* Anne E. Grimmer, 1990.
Website: http://www.nps.gov/history/hps/tps/briefs/brief22.htm

*Preservation Briefs 23: Preserving Historic **Ornamental Plaster**.* David Flaharty, 1990.
Website: http://www.nps.gov/history/hps/tps/briefs/brief23.htm

*Preservation Briefs 24: **Heating, Ventilating, and Cooling** Historic Buildings: Problems and Recommended Approaches.* Sharon C. Park, AIA, 1991.
Website: http://www.nps.gov/history/hps/tps/briefs/brief24.htm

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*Preservation Briefs 26: The Preservation and Repair of Historic **Log Buildings**.* Bruce D. Bomberger, 1991.
Website: http://www.nps.gov/history/hps/tps/briefs/brief26.htm

*Preservation Briefs 27: The Maintenance and Repair of **Architectural Cast Iron***. John G. Waite, AIA, 1991.
Website: http://www.nps.gov/history/hps/tps/briefs/brief27.htm

*Preservation Briefs 28: **Painting** Historic Interiors.* Sara B. Chase, 1992.
Website: http://www.nps.gov/history/hps/tps/briefs/brief28.htm

*Preservation Briefs 29: The Repair, Replacement, and Maintenance of Historic **Slate Roofs**.* Jeffrey S. Levine, 1993.
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*Preservation Briefs 31: **Mothballing** Historic Buildings.* Sharon C. Park, AIA, 1993.
Website: http://www.nps.gov/history/hps/tps/briefs/brief31.htm

*Preservation Briefs 32: Making Historic Properties **Accessible**.* Thomas C. Jester and Sharon C. Park, AIA, 1993.
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Preservation Briefs 33: The Preservation and Repair of Historic ***Stained and Leaded Glass****.* Neal A. Vogel and Rolf Achilles, 1993.
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Preservation Briefs 34: ***Applied Decoration*** *for Historic Interiors: Preserving Historic Composition Ornament.* Jonathan Thornton and William Adair, FAAR, 1994.
Website: http://www.nps.gov/history/hps/tps/briefs/brief34.htm

Preservation Briefs 35: Understanding Old Buildings: The Process of ***Architectural Investigation****.* Travis C. McDonald, Jr. , 1994.
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Preservation Briefs 36: Protecting ***Cultural Landscapes****: Planning, Treatment and Management of Historic Landscapes.* Charles A. Birnbaum, ASLA, 1994.
Website: http://www.nps.gov/history/hps/tps/briefs/brief36.htm

Preservation Briefs 37: Appropriate Methods of ***Reducing Lead-Paint Hazards*** *in Historic Housing.* Sharon C. Park, AIA, and Douglas C. Hicks, 1995.
Website: http://www.nps.gov/history/hps/tps/briefs/brief37.htm

Preservation Briefs 38: Removing ***Graffiti*** *from Historic Masonry.* Martin E. Weaver, 1995.
Website: http://www.nps.gov/history/hps/tps/briefs/brief38.htm

Preservation Briefs 39: Holding the Line: Controlling Unwanted ***Moisture*** *in Historic Buildings.* Sharon C. Park, AIA, 1996.
Website: http://www.nps.gov/history/hps/tps/briefs/brief39.htm

Preservation Briefs 40: Preserving Historic ***Ceramic Tile Floors****.* Anne E. Grimmer and Kimberly A. Konrad, 1996.
Website: http://www.nps.gov/history/hps/tps/briefs/brief40.htm

Preservation Briefs 41: The ***Seismic Retrofit*** *of Historic Buildings: Keeping Preservation in the Forefront.* David W. Look, AIA, Terry Wong, PE, and Sylvia Rose Augustus, 1997.
Website: http://www.nps.gov/history/hps/tps/briefs/brief41.htm

Preservation Briefs 42: The Maintenance, Repair and Replacement of Historic ***Cast Stone****.* Richard Pieper, 2001.
Website: http://www.nps.gov/history/hps/tps/briefs/brief42.htm

Preservation Briefs 43: The Preparation and Use of ***Historic Structure Reports.*** Deborah Slaton, 2004.
Website: http://www.nps.gov/history/hps/tps/briefs/brief43.htm

*Preservation Briefs 44: The Use of **Awnings** on Historic Buildings: Repair, Replacement and New Design.* Chad Randl, 2004.
Website: http://www.nps.gov/history/hps/tps/briefs/brief44.htm

*Preservation Briefs 45: Preserving Historic **Wooden Porches***. Aleca Sullivan and John Leeke, 2006.
Website: not available on-line

*Preservation Briefs 46: The Preservation and Reuse of Historic **Gas Stations**.* Chad Randl, 2006.
Website: not available on-line

*Preservation Briefs 47: Maintaining the Exterior of **Small and Medium Size Historic Buildings**.* Sharon C. Park, FAIA, 2006.
Website: not available on-line

Preservation Tech Notes

Preservation Tech Notes is an on-going series of publications addressing specific technical preservation problems prepared by the Technical Preservation Services Division of the National Park Service. *Preservation Tech Notes* are listed by subject areas. *Only a selective few are available on-line.
Main Website: http://www.nps.gov/history/hps/tps/technotes/tnhome.htm

Doors:
Preservation Tech Notes 1: *Historic **Garage and Carriage Doors**: Rehabilitation Solutions.* Bonnie Halda, AIA, 1989.

Exterior Woodwork:
*Preservation Tech Notes 1: Proper **Painting** and Surface Preparation.* Sharon Park, AIA, 1986.

*Preservation Tech Notes 2: **Paint Removal** from Wood Siding.* Alan O'Bright, 1986.
Website: http://www.nps.gov/history/hps/tps/technotes/PTN18/intro18.htm

*Preservation Tech Notes 3: **Log Crown Repair** and Selective Replacement Using Epoxy and Fiberglass Reinforcing Bars.* Harrison Goodall, 1989.
Website: http://www.nps.gov/history/hps/tps/technotes/PTN28/index.htm

*Preservation Tech Notes 4: Protecting **Woodwork Against Decay** Using Borate Preservatives.* Ron Sheetz and Charles Fisher, 1993.
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Finishes:
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Historic Glass:
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Cas Stachelberg and Chad Randl, 2003.
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Preservation Tech Notes 3: Preserving Historic ***Corridor Doors and Glazing*** *in High-Rise Buildings.* Chad Randl, 2001.
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*Preservation Tech Notes 2: Restoring **Metal Roof Cornices***. Richard Pieper, 1990.
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*Preservation Tech Notes 4: Rehabilitating a Historic **Iron Bridge**.* Joseph P. Saldibar, III, 1997.
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*Preservation Tech Notes 6: Repair and Reproduction of **Metal Canopies and Marquees** with Glass Pendants.* Lauren Van Damme and Charles E. Fisher, 2006.

Museum Collections:

*Preservation Tech Notes 1: Museum **Collection Storage** in a Historic Building Using a Prefabricated Structure.* Don Cumberland, Jr., 1985.

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Website: http://www.nps.gov/history/hps/tps/technotes/PTN30/introduction.htm

Site:

*Preservation Tech Notes 1: Restoring **Vine Coverage** to Historic Buildings.* Karen Day, 1991.

Temporary Protection:

*Preservation Tech Notes 1: Temporary Protection of Historic **Stairways** During Rehabilitation Work.* Charles Fisher, 1985.
Website: http://www.nps.gov/history/hps/tps/technotes/PTN10/intro.htm

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*Preservation Tech Notes 16: Repairing and Upgrading **Multi-Light Wooden Mid Windows**.* Christopher Closs, 1986.

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In addition to the *Preservation Briefs* and *Preservation Tech Notes* the National Park Service has several reports and books available for purchasing through their Technical Preservation Services Division.
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***Access** to Historic Buildings for the Disabled: Suggestions for Planning and Implementation.* Charles Parrott, 1980.

***Cyclical Maintenance** for Historic Buildings.* Henry Chambers, AIA, 1976.

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CHAPTER 17. SOURCES FOR ADDITIONAL INFORMATION BY SUBJECT AREA

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Accommodation of Disabled Visitors at Historic Sites in the National Park System. Duncan S. Ballantyne and Harold Russell Associates, Inc. Washington, D.C.: Park Historic Architecture Division, National Park Service, U.S. Department of the Interior, 1983.

Readily Achievable Checklist: A Survey for Accessibility. Goldman, Nancy Goldman (ed). Boston: Adaptive Environments Center, 1993.

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Preserving the Past and Making it Accessible for People with Disabilities. Thomas C. Jester. Washington, D.C.: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1992.

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Antiterrorism Measures and Force Protection Base Entrance Improvements in a Historic District. Hardlines Design Company. Prepared for the Naval Facilities Engineering Command, Southern Division, 2003.

Antiterrorism Measures for Historic Properties. Julie L. Webster, Patrick E. Reicher, and Gordon L. Cohen, ERDC-CERL. 2006. (available electronically on DENIX)

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ASTM Standard E1300-04. *Standard Practice for Determining Load Resistance of Glass in Buildings.*

ASTM Standard F1642-04. *Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings.*

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Designing for Security in the Nation's Capital.
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The Elements of Style, an Encyclopedia of Domestic Architectural Detail. Stephen Calloway (ed.). Octopus Publishing Company, Ltd., 2005.

Context Study of the United States Quartermaster General Standardized Plans, 1866- 1942. US Army Corps of Engineers, Seattle District, Technical Center of Expertise for Preservation of Structures and Buildings, November 1997. (available electronically on DENIX)

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Website: http://www.heritagepreservation.org/programs/taskfer.htm

A Field Guide to Emergency Response. Heritage Preservation, The National Conservation Institute.

Building an Emergency Plan, A Guide For Museums and Other Cultural Institutions. Valerie Dorge and Sharon L. Jones (compilers). The Getty Conservation Institute, 1999.

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