Army Installation Design Standards
# Summary of Changes

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NOTE: Click “Details” below to view the detailed description of the change.

03 May 2004
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Table of Contents:

Executive Summary:

Chapter 1, Introduction:

Chapter 2, Site Planning Design Standards:

2.3.2.2.4 Edited the old paragraph as follows: The first sentence read, “…concerned with maintaining of restoring…” and now reads, “…concerned with maintaining or restoring…” The last sentence, which had no primary verb, read as follows, “Reducing water pollution and increasing groundwater recharge, using LID to improve the quality of receiving surface waters and stabilize the flow rates of nearby streams.” It now reads, “Using LID to improve the quality of receiving surface waters and stabilize the flow rates of nearby streams reduces water pollution and increases groundwater recharge.”

(Change number: 2005-10-02) (Change Date: 24 October 2005)

2.3.2.2.5 Changed passive voice to “UFC 3-210-10… provides design guidance.” Also url to this UFC is not found on a government server. Even the USACE link to UFCs links to this CCB site despite holding the other UFCs on their on server.

(Change number: 2005-10-02) (Change Date: 24 October 2005)

Chapter 3, Building Design Standards:

*Changed paragraph 3.1.3 to read:

3.1.3 Sustainability Standards

The Army Sustainability Standards shall be met as an integral part of all building design for new construction, sustainment, repair, and modernization to reduce construction, maintenance, and life cycle costs and conserves energy. The SPIRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18 2003). For all other FY06 and future-year MILCON projects the minimum SPIRiT rating requirement is "Gold". See Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003. See Appendix D for a more complete discussion on Sustainable Design.

(Change number: 2004-06-01) (Change Date: 09 June 2004)

*Deleted paragraph 3.2.3.1.1 Company Operation Facility (COF), updated the paragraph numbers for paragraph 3.2.3.1, and changed paragraph 3.2.2.1.1 to read:

3.2.2.1.1 Company Operation Facility (COF) Standards. The AFSC approved Army Standards for Company Operation Facility (COF) are effective starting with FY 06 MCA projects and must be applied to all construction of new COFs on all installations. These
standards shall also be applied to FY05 MCA projects to as great a degree as practical. The AFSC must approve any planned changes from the COF Army Standards. The COF Army Standards incorporate the following characteristics:

- Battalion centric design
- Flexible design
- Enlarged lockers
- Increased interior space
- Covered exterior maintenance areas
- Enlarged arms vaults
- Non-sensitive item secure storage
- Consolidated showers
- Economy of Construction
- Proximity to unit motor pool

Recommended layout for most efficient and flexible configuration will be found in the Company Operation Facility Standard Design, which is currently under development.

(Change number: 2004-06-02) (Change Date: 09 June 2004)

3.2.2.1.1 Company Operations Facilities (COFs) Standards.

3.2.2.1.1.1 The AFSC approved Army Standards for Company Operations Facilities (COFs) on 20 May 2004. These standards are effective starting with FY 06 MCA projects and must be applied to all construction of new COFs on all installations. These standards shall also be applied to FY05 MCA projects to as great a degree as practical. The AFSC must approve any planned changes from the COFs Army Standards. The COFs Army Standards incorporate the following characteristics:

- Battalion centric design
- Flexible design
- Enlarged lockers
- Increased interior space
- Covered exterior maintenance areas
- Enlarged arms vaults
- Non-sensitive item secure storage
- Consolidated showers
- Economy of Construction
- Proximity to unit motor pool

3.2.2.1.1.2 The AFSS approved the Standard Design for Company Operations Facilities on 6 July 2004; Memorandum for Record, subject: Standard Design for Company Operations Facilities, dated 6 July 2004 (See Standard Design for Company Operations Facilities.)

(Change number: 2005-10-02) (Change Date: 24 October 2005)
3.2.2.1.2 **General Instruction Building (GIB) and Army Continuing Education System (ACES) Standards.** The AFSC has approved standards for classroom facilities, which provide for flexibility in instructional use while accommodating all instructional needs as well as providing for administrative, special function use, and support space. These standards include [Standard Design Criteria](#) defining spatial and functional requirements. All facilities shall be ADA compliant. See [The Army Standard for General Instruction Building (GIB) and Army Continuing Education System (ACES) Facilities](#) and Memorandum for Record, Subject: [The Army Standard for General Instruction Building (GIB) and Army Continuing Education System (ACES) Facilities](#), dated 01 December 2004.

(Change number: 2005-01-01) (Change Date: 14 January 2005)

3.2.2.7.5 **Child Development Centers (CDC).** Child Development Centers are intended to serve two juvenile groups: ages 6 weeks to 5 years; and 6 to 10 years.

3.2.2.7.5.1 CDC facilities for ages 6 weeks to 5 years shall conform to Appendix G, Child Development Center of the TECHINFO, TI 800-01, Design Criteria (see also ProjNet).

3.2.2.7.5.2 CDC facilities for ages 6 years to 10 years shall conform to [Army Standards for Child Development Center Construction (for school-age children) October 2004](#) per Memorandum for Record, Subject: [Army Standards for Child Development Centers](#), dated 19 October 2004. These mandatory Army Standards are being incorporated into a Standard Design that will provide floor plans and design criteria.

(Change number: 2004-11-01) (Change Date: 22 November 2004)

3.2.2.7.6 **Family Housing**

3.2.2.7.6.1 **Residential Communities Initiative (RCI)**
3.2.2.7.6.1.1 The intent of the Residential Communities Initiative (RCI) is to improve the housing for military families by providing quality housing, built in attractive neighborhoods.

3.2.2.7.6.1.2 To ensure a uniform level of quality throughout the Residential Communities Initiative (RCI), Headquarters, Department of the Army has developed the “Standards for Housing at RCI Projects - Update # 2”. These standards apply to the construction, renovation, and condition of privatized housing. Compliance with these standards is mandatory unless the Department of the Army (DA) Residential Communities Initiative (RCI) office approves a waiver in writing. These standards apply to RCI projects with Community Development and Management Plan (CDMP) collaboration contracts awarded after January 1, 2005 and are not retroactive to previous projects.

3.2.2.7.6.1.3 All RCI projects planned or under design will meet the "Gold" SPiRiT rating (see Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003).

3.2.2.7.6.1.4 Installation Design Guides (IDG) and RCI Projects. RCI projects will apply installation practices and policies to RCI projects. Paragraph 3(b) of the “Standards for Housing at RCI Projects - Update # 2” reads; “Many installations have published guidelines and construction standards (e.g. Installation Design Guide) that may exceed or differ substantially from local codes and standards. It is DA RCI’s intention that installation practices and polices apply to RCI projects unless waived by appropriate installation authorities. If an installation guideline or standard appears unreasonable for an RCI project and a consensus solution cannot be reached at the installation level, DA RCI may be consulted in resolving the conflicting standards.”

(Change number: 2005-03-01) (Change Date: 09 March 2005)

3.2.2.7.7.1 The AFSC has approved The Army Standard for Army Lodging. These standards promote economies in serving the Army traveler, but not at the expense of quality or service. The standards define the facilities and the level of service the Army traveler should expect when they travel to an Army installation. The facility standard and level of service will be consistent from installation to installation. See The Army Standard for Army Lodging and Memorandum for Record, Subject: Army Standards for Army Lodging, dated 14 December 2004.

(Change number: 2005-01-02) (Change Date: 14 January 2005)
3.2.2.8.1 **Access Control Points (ACPs)** (see also Chapter 4, paragraph 4.7 and Chapter 7, paragraph 7.7). The AFSC has approved The Army Standard for Access Control Points (ACPs). The standard provides detailed criteria for the development of entrance facilities and appurtenances within, and related to, the ACP corridor, which will be understood to include the secured area between the entrance gate and the final set of vehicle barriers. Criteria shall be concerned with all aspects of Force Protection in regard to vehicular and pedestrian access to installations, safety, optimum working conditions for personnel, and the defeat of any threat to installation security. See The **Army Standard for Access Control Points (ACPs)** and Memorandum for Record, Subject: **The Army Standard for Access Control Points**, dated 14 December 2004.

(Change number: 2005-01-03) (Change Date: 14 January 2005)

3.2.2.8.1 **Access Control Points (ACPs)** (Also, see paragraphs 4.8 and 7.7.)

3.2.2.8.1.1 The AFSC has approved The Army Standard for Access Control Points (ACPs). The standard provides detailed criteria for the development of entrance facilities and appurtenances within, and related to, the ACP corridor, which will be understood to include the secured area between the entrance gate and the final set of vehicle barriers. Criteria shall be concerned with all aspects of Force Protection in regard to vehicular and pedestrian access to installations, safety, optimum working conditions for personnel, and the defeat of any threat to installation security. (See UFC 4-022-01, **Security Engineering: Entry Control Facilities / Access Control Points**, The Army Standard for Access Control Points (ACPs), and Memorandum for Record, subject: **The Army Standard for Access Control Points**, dated 14 December 2004.)

3.2.2.8.1.2 The AFSS approved the ACP Design on 14 December 2004 (See **Standard Definitive Design for Access Control Points**.)

(Change number: 2005-10-04) (Change Date: 24 October 2005)

3.2.3.1.1 **Range Standards.** The **Army Sustainable Range Program** (SRP), proponent is HQDA Office Deputy Chief of Staff Operations, ODCSOPS/G3 (DAMO-TRS), phone number (703) 692-6410. The SRP develops and manages standard designs for Army Ranges in accordance with AR 210-21 and Training Circular 25-8 Army Training Ranges. The Range Standards are available on the following web pages.

- Revised Range Design/Construction Interface Standards.
- Unexploded Ordnance Considerations in the Planning, Design, and Const [Supplement to CEHNC 1110-1-23 Manual](#).

(Change number: 2005-10-05) (Change Date: 24 October 2005)

3.2.3.1.10 **Information Systems Facility**

(Change number: 2005-01-04) (Change Date: 14 January 2005)
3.2.3.1.11  **Airfields, Railroad, and Pavements**

(Change number: 2005-01-05) (Change Date: 14 January 2005)

3.5.11  **Locks and Locking Devices.** Programmable electronic key card access systems will be installed in all Army facilities, per MFR dated Dec 14 2004, Subject: The Army Standards for Electronic Key Card Access for all Facilities.

(Return To Summary) (Change number: 2004-12-01) (Change Date: 21 December 2004)

3.5.11  **Locks and Locking Devices.** The implementation guidance for programmable electronic key card access systems policy memorandum issued 14 December 2004 is in the next two paragraphs. The basic memorandum requires the use of electronic, programmable electronic key card access systems for all new construction and major building renovations. See Memorandum for Record, Subject: The Army Standards for Electronic Key Card Access for all Facilities.

3.5.11.1  Beginning in FY07, electronic key card access systems must be included in projects for facility types listed in paragraph 3.5.11.2. Electronic key card access systems will be treated as real property and are subject to normal work classification regulations. Access systems will be funded using MILCON or operation and maintenance construction or repair appropriations. Once technical implementation guidance is developed and published, all proposed FY06 and Congressional add projects that are less than 35% designed will be evaluated on a case-by-case basis to determine if electronic key card access systems should be incorporated.

3.5.11.2  Technical implementing guidance will be developed by HQDA and fielded by December 2005. The intent of the current policy memorandum is to utilize hotel room type card access systems on interior and exterior doors where keys are provided to successive tenants over the life of the building. The priority for implementation is Unaccompanied Enlisted Personnel Housing, Transient Lodging, Officers Quarters, Operational Readiness Training Complexes, Battalion/Brigade Headquarters, Company Operations Facilities, Tactical Equipment Maintenance Facilities, and Administrative Buildings.

3.5.11.3  Each Army installation will develop a master plan for the Electronic Key Card Access system. The master plan should specify that all buildings will use equipment from a single manufacturer so that there is consistency, compatibility, and sustainability across installed Electronic Key Card Access equipment. Each installation will be responsible for obtaining the appropriate sole source justification for their installation in coordination with the IMA region.

3.5.11.4  In keeping with the Transient Lodging Standards, spaces for access by Directorate of Public Works personnel may retain key systems until a project for full conversion of all DPW access can be executed. If a new building is being built on an installation that already has electronic key card access equipment on existing buildings, the requirement for a single-type or compatible equipment for the whole installation serving both existing and new facilities should be implemented.

(Change number: 2005-03-02) (Change Date: 09 March 2005)
3.18.1 The cited Army Standards shall be met. *(The following Standards were added to the list.)*

- **Army Standards for General Instruction Building (GIB) and Army Continuing Education System (ACES) Standards**
- **General Instruction Building (GIB) and Army Continuing Education System (ACES) Standard Design Criteria**
- **The Army Standard for Army Lodging**
- **The Army Standard for Access Control Points (ACPs)**
- **The Army Standards for Electronic Key Card Access for all Facilities**

*(Change number: 2005-01-06) (Change Date: 14 January 2005)*

**Chapter 4, Circulation Design Standards:**

4.6 **PAVEMENT MARKING STANDARDS**

4.6.1 Pavement markings shall be as described in Part 3 of the *Manual of Uniform Traffic Control Devices (MUTCD)*, also see Chapter 6, Site Elements, paragraph 6.4.3.4 for traffic related signage.

4.6.2 Concrete curbs and gutters shall not be painted. Markings shall be restricted to the pavement surface and marking paint shall not be applied to concrete curb, gutter, or any portion thereof including curb cuts for vehicle or wheelchair access.

4.6.3 Markings intended to prohibit parking shall be applied to the pavement surface parallel to the curb and gutter in a continuous band for the entirety of the restricted length of pavement.

4.6.4 Where appropriate a boxed area shall be created with diagonal lines to establish a no parking zone in street conditions such as curb side parking, etc.

*(Change number: 2004-10-01) (Change Date: 22 October 2004)*

**Chapter 5, Landscape Design Standards:**

**Chapter 6, Site Elements Design Standards:**

6.3.7.3.2

Fences for outdoor swimming pools will comply with the requirements of this section and other applicable Army safety references. Swimming pools are any structure intended for swimming, recreational bathing or wading that contains water over 24 inches (610mm) deep. This includes in-ground, above-ground and on-ground pools; hot tubs; spas and fixed-in-place wading pools. Swimming pools will be completely enclosed by a fence at least 4 feet (1290 mm) in height or a screen enclosure. Openings in the fence will not permit the passage of a 4-inch-diameter (102...
mm) sphere. The fence or screen enclosure will be equipped with self-closing and self-latching gates.

(Change number: 2005-10-06) (Change Date: 24 October 2005)

6.6.6.4 Water Storage Tanks. A water storage tank that has visual strength in its form can be used as a focal point or identifying landmark that can provide a sense of orientation within the installation.

6.6.6.4.1 Water Storage Tank Painting. With the following exception, water storage tanks will be finished with a solid tan or sky blue color (see Appendix L). Water storage tanks on airfields or in the proximity of an airfield and situated in a location that could cause an adverse effect to an aviator flying a pattern or on approach will be painted in a checkerboard pattern using aviation orange and white coloring as directed by Federal Aviation Administration Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting, (see paragraph 121 for paint standards). Graphics and artwork on the water storage tank shall be limited to the installation name and the Installation Unit Crests as approved in the Installation Design Guide.

6.6.6.4.2 Water Storage Tank Lighting. Lighting of water storage tanks will be as prescribed in Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting.

6.6.6.5 Fire hydrants will be nutmeg brown in color with a reflective finish (see Appendix L for color). They will be visible and free of screening (Fig. 1-6.31). This is the color adopted as the Army Standard on all installations. Following guidance from the National Fire Protection Association (NFPA) 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants, a painted accent band on the bonnet shall indicate tested water pressure (Class AA = Light Blue; Class A = Green; Class B = Orange; Class C = Red) as scheduled in the NFPA 291.

(Change number: 2004-11-02) (Change Date: 22 November 2004)

Chapter 7, Force Protection Design Standards:

7.2.1.4 When the minimum standoff distances cannot be achieved because land is unavailable, the standards allow for building hardening to mitigate blast effects. Costs and requirements for building hardening will be addressed in the DoD Security Engineering Manual. See paragraph 7.2.2 below for information regarding the DoD Security Engineering Manual.

(Change number: 2005-10-07) (Change Date: 24 October 2005)

7.2.2 Implementing Design Standards.
7.2.2.1 Additional guidance on applying the DoD Minimum Antiterrorism Standards for Buildings can be found in UFC 4-010-02, Design (FOUO): DoD Minimum Standoff Distances for Buildings. This document includes tables 1 and 2, which identify the minimum standoff distances and separation for new and existing buildings and expeditionary and temporary structures. The last column of each table, titled “Applicable Explosive Weight”, includes specific explosive weights in kilograms (pounds) of TNT, which makes these tables for official use only (FOUO).

7.2.2.2 Access to UFC 4-020-02 can be gained through the U.S. Army Corps of Engineers Protective Design Center (PDC) web-based library. A user name and password are required. Site entry is restricted to U.S. Government agencies and their U.S. contractors. However, many of the publications listed on the site are approved for public release and can be found on the web at Publications of Headquarters, Corps of Engineers web page or on the web ProjNet Unified Facilities Criteria site.

(Change number: 2005-10-07) (Change Date: 24 October 2005)

7.7 GATES AND ENTRANCES (ACCESS CONTROL POINTS [ACP]) STANDARDS

7.7.1 Installation entry points are key components in the force protection security program. The most effective entrances accommodate the functions of observation, detection, inspection, access control, and disablement of hostile personnel and vehicles, while containing the vehicles and pedestrians until access is granted. These areas are some of the most important installation features in the creation of a sense of arrival for both installation personnel and visitors. It is important that these areas present a positive public image (see paragraph 4.8). (Fig. 1-7.6)

7.7.2 The Headquarters, Department of the Army force protection standards for ACPs is found in UFC 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points and The Army Standard for Access Control Points (ACPs) (see paragraphs 3.2.2.8.1.1 and 3.2.2.8.1.2).

Delete 7.7.2.1 and 7.7.2.2

7.7.2.1 Canopies for ACPs. ACPs will have a canopy, which will cover the full width of incoming lanes at the Guard Booth. The canopy shall have a minimum clearance of 14.5 feet and shall have a minimum length of 50 feet. Supporting structure of roof will consist of columns sized and located to create peripheral vision for the guards with minimal obstructions. Lighting will provide a minimum of 10 ft-candles with a Color Rendition Index of 65. Measures will be taken to protect the canopy from the threat of an over-height vehicle.

7.7.2.2 The Interim Army Standard for Canopies at Army Installation Access Points, Feb. 2004

(Change number: 2005-10-07) (Change Date: 24 October 2005)

7.7.3 Physical Security Equipment Standards
7.7.3.1 The Product Manager, Force Protection Systems (PM-FPS) under DoD Directive 3324.3 is assigned the mission of developing, fielding, and supporting physical security equipment throughout its life cycle for the Army, Joint Services, and other Government agencies.

7.7.3.2 The DoD Directive 3324.3 assigns specific areas of responsibility which include: interior FPS, C2 systems, security lighting, force protection systems, tactical security, barrier and systems, and interior and exterior robotics. Management functions include responsibility for research, development, acquisition, fielding, and logistics support of FPS except for those functions specifically assigned to other Services or to the Defense Threat Reduction Agency (DTRA). The PM-FPS homepage and the DA approved equipment Blank Purchase Agreements (BPAs) are listed below.

- Product Manager – Force Protection Systems (PM-FPS) Homepage
- DA Approved FPS Equipment Blanket Purchase Agreements (BPAs)

(Change number: 2005-10-07) (Change Date: 24 October 2005)

Index:

Added hyperlinks to all paragraph numbers in the Index, the changes are too extensive to list here. Click on the change number below to see the Index.

(Change number: 2004-07-01) (Change Date: 20 July 2004)

Appendix L:

Updated Appendix L to reflect the PANTONE® trademark.

(Change number: 2004-11-03) (Change Date 22 November 2004)

Appendix M:

M.5 REFERENCES

- Advisory Council on Historic Preservation
- United States Army Environmental Center Historic Buildings
- United States Army Environmental Center Native Indian Affairs
- United States Army Environmental Center Archeology

(Change number: 2005-10-08) (Change Date: 24 October 2005)

Appendix P:
Updated the contact list in Appendix P, the changes are too extensive to list here. Click on the change number below to see Appendix P.

(Change number: 2004-06-03) (Change Date: 21 June 2004)

Comment Form:
ARMY INSTALLATION DESIGN STANDARDS

The following Table of Contents is interactive. Click on the hyperlink to directly access the Section or Sub-section. To return to the Table of Contents use the back button on your browser.

Suggested Improvements: Submit comments and suggested improvements on the comment form provided to Facilities Policy Division, Assistant Chief of Staff Installation Management (Comment Form).

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ES.1 PURPOSE

The purpose of the Army Installation Design Standards (IDS) is to provide directives for the mandatory common facility and infrastructure standards for all Army installations. These standards set a common basis to facilitate the continuous improvement of the functional and visual aspects of all Army installations (Fig. 1-ES.1). It is also the purpose of these standards to promote sustainable designs and developments and to promote an integrated design process for all projects.

ES.2 AUTHORITY

Authority for this document is derived from the Message from Vice Chief of Staff Army (VCSA), dated 241209Z Apr 03, Subject: Army Installation Design Standards, which directs implementation of the Army Installation Design Standards effective 28 April 2003.

ES.3 APPLICABILITY

ES.3.1 This document is applicable to all installations and activities under jurisdiction and supervision of the Department of the Army in the United States, its territories and possessions, the Commonwealth of Puerto Rico, and in foreign countries. This document applies to the National Guard and Army Reserves, and includes planning and development of base camps in theaters of operation.

ES.3.2 Organizational Responsibilities; Army Facilities Standardization Committee (AFSC) process for development of facilities standards, waiver, and change procedures are defined in Chapter 1, Introduction.
ES.4 BACKGROUND

ES.4.1 The Installation Design Standards (IDS) provide the Army Standards for all facilities. The Installation Design Guide Model follows the concept established in the Joint Service Unified Facilities Criteria Installation Design manual (UFC 2-600-01).

ES.4.2 Research was conducted to incorporate into Army standards the best practices from other organizations such as the Air Force, Navy, Army and Air Force Exchange Services (AAFES), General Services Administration (GSA), National Park Service, Federal Highway Administration, and various city and county governments, and associations.

ES.5 SCOPE

ES.5.1 The IDS consists of two parts.

ES.5.2 Part 1, Army Installation Design Standards. Part 1 of the IDS consists of six chapters, which provide comprehensive Army standards in the following areas:

- Site Planning Design Standards (Chapter 2)
- Building Design Standards (Chapter 3)
- Circulation Design Standards (Chapter 4)
- Landscape Design Standards (Chapter 5)
- Site Elements Design Standards (Chapter 6)
- Force Protection Design Standards (Chapter 7)

ES.5.2.1 Site Planning Design Standards

ES.5.2.1.1 Site planning is the process of arranging an external physical environment in complete detail to include the structures, circulation patterns, and other elements that form the built environment. The site planning and design process is used to develop a project that fulfills facility requirements and creates the optimal relationship with the natural site (Fig. 1-ES.2).

ES.5.2.1.2 The goal of site planning for Army installations is functional attractive, sustainable development. Sustainability requires the built environment to be designed and constructed to preserve and enhance the natural environment. Manmade facilities are designed as a part of the environment to minimize negative environmental impacts. General site planning techniques resulting in sustainable development are cost efficient because they conserve energy and reduce construction and maintenance costs.
ES.5.2.2  **Building Design Standards**

ES.5.2.2.1 Building design standards encompass the character of buildings as well as the arrangement of buildings to one another and to their environment. The use of architectural style, materials, and colors are given consideration in the development of an installation. Also, the preservation of historically and culturally significant structures is recognized for its importance in adding to an installation’s character and providing a sense of heritage (Fig. 1-ES.3).

ES.5.2.2.2 The Building Design Standards include standard for key facility types and for all facilities, sustainability, accessibility, use of materials, placement of entrances, incorporation of additions and renovations. The standards applying to all facilities are also established for physical security requirements, structural character, seismic design, exterior materials and colors, plazas and courtyards, service areas, interior design, the appropriateness and quality of building maintenance, mechanical systems, and electrical and communications systems.

ES.5.2.3  **Circulation Design Standards**

ES.5.2.3.1 Circulation design standards are relevant to the design and location of roadways, walkways, trail ways, bikeways, installation entrances, and parking lots. The primary roadway system and parking lots utilize considerable amounts of land and are a visually dominant element of any installation.

ES.5.2.3.2 The circulation system provides a primary vantage point from which all installations are viewed. Safe and efficient vehicular movement results in better orientation and contributes to the development of a positive environment for installation personnel and visitors (Fig. 1-ES.4).

ES.5.2.4  **Landscape Design Standards**

ES.5.2.4.1 Landscape Design Standards include the selection, placement, maintenance, and sustainability of plant material on an installation. Landscape plantings provide a simple and cost effective enhancement to the functional aspects and appearance of an installation (Fig. 1-ES.5).

ES.5.2.4.2 The visual image conveyed by a military installation is defined, not just by architectural character and site organization, but also by an attractive, organized landscape design. Plantings also add an element of human scale to open spaces and can be used...
functionally to screen undesirable views, buffer winds, reinforce the hierarchy of the circulation system, or provide a visual transition between dissimilar land uses.

ES.5.2.5 Site Elements Design Standards

ES.5.2.5.1 Site elements include all visual elements of an installation that are considered utilitarian in use (Fig. 1-ES.6). These elements include the following categories of amenities:

- Site Furnishings
- Signs
- Lighting
- Utilities

ES.5.2.5.2 These categories of the site elements design standards provide dominant visual impacts within an installation. The specific site element features and equipment reflect the Army Standard and local or regional design characteristics. This allows for consistent Army function from installation to installation, ease of maintenance, and blending into the local community.

ES.5.2.6 Force Protection Design Standards

ES.5.2.6.1 Accommodating the need for security and antiterrorism is a significant concern for all military facilities design. Security and antiterrorism requirements must be integrated into all projects where applicable.

ES.5.2.6.2 Site elements such as fences, courtyards, screen walls, swales, berms, planters, and retaining walls are effective measures for facility protection (Fig. 1-ES.7). The design and placement of such protective elements seek to visually enhance and complement the design of the facility to which it is a component.

ES.5.3 Part 2, Model Army Installation Design Guide. Part 2 of the IDS provides a “Model Army Installation Design Guide” which is to be used by all installations in the development of their installation specific Installation Design Guide (IDG) document.

ES.5.3.1 The IDG provides standards based on IDS, basic design principles, and guidelines to installation decision makers, contracted and in-house planning and design professionals, installation maintenance personnel, and others. The IDG sets interior and exterior standards and planning criteria to be integrated into all proposals, design and construction contracts,
renovation, maintenance, or repair projects performed on the installation or its properties.

ES.5.3.2 The IDG promotes a sense of arrival, functional compatibility, visual harmony and order, relates the natural and man-made environment, and achieves consistent architectural themes throughout an installation. The general steps involved in the development of an IDG and which are presented in the model are:

- Establishment of an installation profile.
- Conduct surveys to determine the assets and liabilities of the installation relative to the standards given in the IDS and IDG.
- Development of visual zones and themes throughout an installation (Fig. 1-ES.8).
- Development of projects needed to bring the installation into compliance with the IDS and IDG, cost estimate, the priority set by the garrison Real Property Planning Board and approved by the Installation Management Agency (IMA).

![Fig. 1-ES.8 - Example of Themes and Visual Zones](image-url)
ES.6 SUMMARY

The aforementioned standards supercede all previous directives and are to be implemented in all current and future Army construction projects. Doing so will effect a steady transformation of all Army installations with continuous functional and visual improvements in a uniform and cohesive manner and with sustainability and an integrated design process for all projects as key design considerations.
1.1 PURPOSE

The purpose of the Army Installation Design Standards (IDS) is to provide the mandatory common facility and infrastructure standards for all Army installations. These standards set a common basis to facilitate the continuous improvement of the functional and visual aspects of Army installations (Fig. 1-1.1). These standards promote sustainable design and development and an integrated design process for all projects. The standards provide:

- Standardization across all of our posts and garrisons.
- Sense of community, order, tradition, and pride.
- Guidance on cost-effective resource investment.
- Sustainability, reliability, and efficiency.

1.2 AUTHORITY

Authority for this document is derived from: Message from Vice Chief of Staff Army (VCSA), dated 241209Z Apr 03, Subject: Army Installation Design Standards. This message directs implementation of the Army Installation Design Standards effective 28 April 2003. The standards will be maintained on the Assistant Chief of Staff for Installation Management (ACSIM) homepage. http://www.hqda.army.mil/acsimweb/homepage.shtml.

1.3 APPLICABILITY

This document is applicable to all installations and activities under jurisdiction and supervision of the Department of the Army in the United States, its territories and possessions, the Commonwealth of Puerto Rico, and in foreign countries. This document applies to
the National Guard, the Army Reserves, and includes planning and development of base camps in theaters of operation.

1.4 RESPONSIBILITIES

1.4.1 The Assistant Chief of Staff for Installation Management (ACSIM)

The ACSIM serves as the proponent for installation management doctrine and is responsible for establishing policy and procedures governing comprehensive installation management. The ACSIM will -

1.4.1.1 Establish Army facility standards and approve deviations from the standards. Maintain electronic newsletter for communicating changes in standards.

1.4.1.2 Approve Army Installation Design Standards Implementation Plan.

1.4.1.3 Approve Army Installation Design Standards Investment Strategy.

1.4.1.4 Chair the general officer Army Facilities Standardization Committee (AFSC).

1.4.1.5 The OACSIM Director Facilities and Housing will chair the Senior Executive Service (SES) Army Facilities Standardization Sub-Committee (AFSSC).

1.4.2 The Director of the Installation Management Agency (IMA)

The IMA is responsible for ensuring the implementation of programs and policies directly associated with installation management as directed by the ACSIM. The IMA will -

1.4.2.1 Develop and execute the Army Installation Design Standards Implementation Plan.

1.4.2.2 Develop and execute the Army Installation Design Standards Investment Strategy.

1.4.2.3 Ensure installation compliance with the Army Installation Design Standards.

1.4.2.4 The Director IMA is an AFSC member.
1.4.2.5 The Deputy Director is an AFSSC member.

1.4.3 IMA Region Directors

The IMA Region Directors will –

1.4.3.1 Approve the Installation Design Guides and Prioritization Projects Lists, as designated by HQ IMA.

1.4.3.2 Review changes to projects and requests for IDS waivers or changes submitted by Garrison Commanders and forward to HQIMA / ACSIM with recommendations.

1.4.3.3 Provide an associate (non-voting) member to the installation Real Property Planning Board (RPPB) of supported installations.

1.4.4 Senior Mission Commanders

The Senior Mission Commanders will -

1.4.4.1 Review the IDG prior to submission to IMA Region Director.

1.4.4.2 Review and provide input to the RPPB Prioritized Improvement Projects list recommendations to meet Army standards prior to submission to IMA Region Director.

1.4.5 Commanders of Major Army Commands (MACOM)

Each MACOM will-

1.4.5.1 Provide input into project functional requirements together with the Army Staff proponent.

1.4.5.2 Participate in development of Prioritization Improvement Projects List.

1.4.6 Corps of Engineers

The Director of Military Programs General Officer is an AFSC member and a SES Deputy is an AFSSC member.

1.4.7 Commanders of Army Garrisons and their Staffs

These commanders and their staffs will –

1.4.7.1 Develop the Installation Design Guide (IDG).
1.4.7.2 Chair installation RPPB to review and approve projects established on the IDG Prioritized Improvement Projects List to meet Army standards.

1.4.7.3 Submit Prioritized Improvement Projects List for approval and funding IAW Director, IMA instructions.

1.4.7.4 Conduct Planning and Design Charrettes. See ACSIM Memorandum, DAIM-ZA, “Planning Charrettes for Military Construction, Army (MCA) Projects” dated 3 Mar 03. See also ACSIM Memorandum, DAIM-FD, “Conducting a Planning Charrette for Military Construction, Army (MCA) Projects” dated 2 Apr 03.

1.4.8 Commanders of Tenant Organizations

Each tenant organization commander will -

1.4.8.1 Participate in installation RPPB.

1.4.8.2 Participate in design and planning charrettes.

1.4.8.3 Provide input into project functional requirements.

1.4.8.4 Participate in design reviews.

1.4.8.5 Participate in development of Prioritization Projects List.

1.5 ARMY FACILITIES STANDARDIZATION COMMITTEE (AFSC)

1.5.1 The Army Facility Standardization Committee (AFSC) established the process for development of Army standards, technology standards, and standard designs for new construction and renovation of existing facilities regardless of the type of funding (Operation Maintenance Army [OMA], Non-Appropriated Funds [NAF], Military Construction Army [MCA], Tenant, DoD, etc.) The overall objective is to achieve functional and efficient facility life-cycle management from cradle-to-cradle through setting standards, planning, programming, design, construction, operation, maintenance, repair, renovation, and replacement of Army facilities.

1.5.2 The AFSC members are Assistant Chief of Staff for Installation Management (Chair), Director Installation Management Agency (IMA), and Director Military Programs, U. S. Army Corps of Engineers (USACE).
1.5.3 The general officer AFSC established the Army Facility Standardization Sub-Committee (AFSSC). Members are ACSIM Director Facilities and Housing (Chair), IMA Deputy Director, and USACE Deputy Military Programs. The AFSSC identifies staffing / resource requirements, implementation guidance, and recommendations on IDS changes and waivers.

1.5.4 The AFSC general officer level committee reports its actions to the Installation Management Board of Directors (IMBOD) chaired by Vice Chief of Staff, Army (VCSA). The AFSSC is responsible for standards and criteria development, funding, resourcing, prioritization, work assignment, and development. To ensure proposed Unified Facility Criteria (UFC) are compatible with Army Standards, support Army facility priorities, and fulfill the goals of the Chief of Staff, Army the AFSSC will review UFCs pending approval and determine those requiring review and approval by the AFSC. (See ACSIM Memo dated 10 April 2004, Subject: Unified Facility Criteria (UFC) Process). The IDS shall be considered as the Army Standard. Changes to the IDS will be staffed with AFSSC for approval by AFSC. The ACSIM and Director IMA require every installation to develop an Installation Design Guide (IDG) following the model in Part 2, to comply with the IDS.

1.5.5 The AFSC is looking at how to make installations better, to get a common feel across all of the Army installations to ensure one Army corporate view.

1.5.6 Working groups and functional teams support the AFSC and AFSSC.

1.5.6.1 Facilities Design Group (FDG) meets monthly and includes the HQDA Program Managers and supporting Facility Design Teams (FDT).

1.5.6.1.1 Centers of Standardization (COS) are regional offices, assigned the task of establishing not only the standards for particular facility types but also prototype plans. These centers are listed in Appendix P.

1.5.6.2 Technology Standards Group (TSG) meets monthly and includes HQDA Program Managers and supporting Discipline Working Teams (DWT).
1.6 **IDS WAIVERS OR CHANGES**

1.6.1 A Request for Waiver for installation specific situations and Army wide changes for improvements to the IDS may be submitted for consideration.

1.6.2 Request for IDS waivers and IDS changes will be sent from installation Garrison Commanders, through IMA to ACSIM following the process shown in Figure 1-1.2.

1.6.3 At its quarterly meetings, the AFSC will consider requests for waiver or change. Based on the findings and recommendations of the AFSSC, the AFSC will approve or disapprove the request for IDS waiver or IDS change, with or without comments, conditions, or requirements. A request for waiver or change should provide a clear and concise explanation as to the reasons for the waiver or change, including the proposed alternative and the consequences of adherence to the IDS.

1.6.4 Approved requests for changes will be posted to the [IDS Newsletter](#) website and will be incorporated into the IDS. To subscribe to the IDS Newsletter, go to the [ACSIM](#) website, Reference section, Army Installation Design Standards, Army IDS E-news, Subscriber Information.

1.6.5 Waiver Requests are submitted, tracked, and the final disposition posted on the [IDS Home Page](https://www.idsarmy.hqda.pentagon.mil/Army_IDS/).

1.7 **ORGANIZATION**

1.7.1 The IDS consists of two parts.

1.7.2 Part 1 of the IDS contains six chapters, which provide comprehensive Army standards in the following areas:

- Site Planning Design Standards (Chapter 2)
• Building Design Standards (Chapter 3)
• Circulation Design Standards (Chapter 4)
• Landscape Design Standards (Chapter 5)
• Site Elements Design Standards (Chapter 6)
• Force Protection Design Standards (Chapter 7)

See Figs. 1-1.3, 1-1.4, and 1-1.5.

1.7.3 Part 2 of the IDS provides a “Model Army Installation Design Guide” which is to be used by all installations in the development of their installation specific IDG document. The IDG provides standards and guidelines to installation decision makers, contracted and in-house planning and design professionals, installation maintenance personnel, energy managers, environmentalists, and others. The IDG sets interior and exterior standards and planning criteria to be integrated into all proposals, design and construction contracts, renovation, maintenance, or repair projects performed on an installation or its properties.

1.8 INSTALLATION STATUS REPORT (ISR)

An Installation Status Report (ISR) provides the condition of all facilities based on the conduct of annual installation assessments. Each facility condition is evaluated based on the standards set forward in this document and all deficiencies assessed. Installation funding may then be determined based, in part, on the need for improvement established in the annual ISR.

1.9 CATEGORY CODES (CATCD)

An inventory maintenance system has been developed for use with all Army properties, both real and personal. The system is dependent on Category Codes (CATCDs or “cat codes”) which are defined in the Department of the Army Pamphlet (DA Pam) 415-28, Guide to Army Real Property Category Codes. Category Codes (CATCD) consist of five digits. The first digit identifies the facility as being in one of the following nine facility classes:

1. Operational and Training Facilities
2. Maintenance and Production Facilities
3. Research, Development, Test, and Evaluation Facilities
4. Supply Facilities
5. Hospital and Medical Facilities
6. Administrative Facilities
7. Housing and Community Facilities
8. Utilities and Ground Improvements
9. Real Estate
The remaining digits define various parameters that further categorize the facility specifics.

A CATCD identifies a specific type of use. A building may contain rooms with different functions and may contain more than one CATCD.

Appendix B of DA Pam 415-28 lists all facilities numerically and includes brief facility descriptions, while Appendix C, lists them alphabetically.
2.1 INTRODUCTION

2.1.1 Site Planning is the process of arranging an external physical environment in complete detail to include the structures, circulation patterns, and other elements that form the built environment. The site planning and design process is used to develop a project that fulfills facility requirements and creates the optimal relationship with the natural site. Environmental documentation will be prepared to support the construction activity in accordance with AR 200-2, Environmental Effects of Army Actions.

2.1.2 Site planning provides for the spatial arrangement of the installation (Fig. 1-2.1). The installation master plan provides information that forms the foundation for site planning. The master plan is a mechanism for ensuring that individual projects are sited to meet overall installation requirements and objectives. Information concerning the Master Plan is provided in the following Army Regulations:

- AR 210-20, Master Planning for Army Installations
- AR 415-15, Army Military Construction Program Development and Execution

2.1.3 The remaining design standards are dependent upon site planning for their location and spatial relationships. These
standards are identified below and discussed in their respective chapters.

- Buildings Design Standards (Chapter 3)
- Circulation Design Standards (Chapter 4)
- Landscape Design Standards (Chapter 5)
- Site Elements Design Standards (Chapter 6)
- Force Protection Design Standards (Chapter 7)

2.1.4 Site planning standards and techniques that result in sustainable development, conserve energy, and reduce construction and maintenance costs. (See Appendix D for a more complete discussion on Sustainable Design. Site standard planning objectives include the following).

2.1.4.1 Preserve natural site features such as topography, hydrology, vegetation, and tree cover.

2.1.4.2 Locate facilities with consideration of climatic conditions such as wind, solar orientation, and microclimate.

2.1.4.3 Preserve the natural site by adapting planned construction to the existing land forms and features. This approach minimizes extensive earthwork, preserves existing drainage patterns, and preserves existing vegetation.

2.2 SITE PLANNING STANDARDS

2.2.1 Determine the primary “fit” of the design to its environment initially by the site analysis and subsequent site planning (Fig. 1-2.2).

2.2.2 Accessibility. Uniform Federal Accessibility Standards (UFAS) established by public law requires any DoD building or facility used only by able-bodied personnel need not be accessible to the disabled. Nevertheless, UFAS requires when feasible and appropriate DoD to, seek to incorporate accessibility measures into the design since the facility use may change over time, (military exclusion is provided in paragraph 4.1.4[2] of the UFAS).

2.2.2.1 All other structures or facilities must meet the standards of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the UFAS, with the most stringent standards applied in the event of conflicting guidelines (see AR 420-70, Chapter 2, Para 2.8). This includes the avoidance of site barriers through the use of curb cuts, ramps, handrails, and grade-level entrances. Provide designated handicapped parking spaces in all
major parking lots and drop-off zones for persons with mobility impairments.

2.2.2.2 Modify existing structures for handicapped accessibility whenever repairs are made to that part of the facility or renovation/modernization to the whole facility. Especially community facilities that are most likely to be used by family members, veterans, or visitors.

2.2.3 Environmental. Environmental issues will be considered in the preparation of a site plan include any action or proposal that has a detrimental affect on a site area’s land, water, or air quality. The location of facilities on land that results in minimal disturbance to the existing topography, vegetation, and drainage patterns greatly reduces the negative impact on the environment. It is the Garrison Commanders responsibility to ensure that all National Environmental Policy Act (NEPA) documentation is developed concurrently with the site selection process, as this process feeds the Military Construction Project Programming 1391 process, for both new construction and restoration/modernization of existing facilities.

2.2.3.1 NEPA requires that an Environmental Impact Statement (EIS) be submitted to the U. S. Environmental Protection Agency (EPA) for major projects that may significantly effect the environment. The EPA reviews and responds to filed impact statements. Information pertaining to Environmental Impact Statements and their submission requirements can be found at the following EPA web links.

- Environmental Impact Statement (EIS)
- Submitting Environmental Impact Statements (EISs)

2.2.3.2 Federal law requires that prior to the undertaking of activities which effect the nation's waterways, described as "navigable waters of the United States" and "waters of the United States" to include wetlands, a permit must be acquired. Information regarding statutory, administrative, and judicial matters, including general regulatory policy, definitions of "waters of the United States" and "navigable waters", and processing of permits can be obtained at the following Corps of Engineers website.

- Statutory, Administrative, and Judicial Materials

2.2.3.3 Mitigate environmental concerns in the early stages of project development. Avoid siting development or individual
buildings in environmentally sensitive areas. The Installation Master Plan environmental overlay will be incorporated into the development for areas designated as threatened and endangered species habitat areas.

2.2.3.4 All sites, which do not currently appear to have been developed, may conceal elements such as unexploded ordnance, abandoned underground storage tanks, and/or hazardous waste. Follow the DoD “Clean Site” policy to insure that all such elements are safely eliminated.

2.3 SITE PLANNING DESIGN STANDARDS

2.3.1 Site planning will include the standards for architectural design, circulation, landscape architecture, site elements, and force protection. Site planning standards are divided into two categories, natural conditions and manmade conditions. These are to be used for the assessment of the visual impact and functionality of site planning.

2.3.2 Natural Conditions

2.3.2.1 Topography Standards. The natural terrain is a major determinant of the layout and form of the installation. The following will be used to maintain the natural topography of the installation.

2.3.2.1.1 Maintain natural ground slopes and elevations.

2.3.2.1.2 Align roadways and buildings along topographic lines.

2.3.2.1.3 Use moderately sloping areas for buildings with less ground coverage area.

2.3.2.1.4 Avoid development on steep slopes.

2.3.2.1.5 Avoid development in natural drainage ways and flood plains.

2.3.2.1.6 Provide a balance of cut and fill.

2.3.2.2 Hydrology Standards. The site planning team will follow hydrology standards for natural drainage corridors, floodplains, and waterways during the site planning process.

2.3.2.2.1 Preserve and maintain natural drainage areas and floodplains.
2.3.2.2 Limit development in floodplains to open spaces and recreation uses.

2.3.2.3 Preserve rivers, lakes, streams, or other waterways, and incorporate them into the design layout.

2.3.2.4 Apply a Low Impact Development (LID) stormwater management strategy that is concerned with maintaining or restoring the natural hydrologic functions of a site to achieve natural resource protection objectives and fulfill environmental regulatory requirements. LID employs a variety of natural and built features that reduce the rate of runoff, filter out its pollutants, and facilitate the infiltration of water into the ground. Using LID to improve the quality of receiving surface waters and stabilize the flow rates of nearby streams reduces water pollution and increases groundwater recharge.

2.3.2.5 LID incorporates a set of overall site design strategies as well as highly localized, small-scale, and decentralized source control techniques referred to as Integrated Management Practices (IMPs). IMPs may be integrated into buildings, infrastructure, or landscape design. Rather than collecting runoff in piped or channelized networks and controlling the flow downstream in a large stormwater management facility, LID takes a decentralized approach that disperses flows and manages runoff closer to where it originates. Because LID embraces a variety of useful techniques for controlling runoff, designs can be customized according to local regulatory and resource protection requirements, as well as site constraints. New projects, redevelopment projects, and capital improvement projects will all be viewed as candidates for implementation of LID. Unified Facilities Criteria (UFC) 3-210-10, Design: Low Impact Developing Manual provides design guidance.

2.3.2.3 Climate Standards. An installation will be designed in response to local climatic conditions to provide a more comfortable environment and reduce the demands for heating and cooling (Fig. 1-2.3).

2.3.2.3.1 Cool Regions. Design and develop sites by maximizing the warming effect of solar radiation in winter and reduce the impact of cold winter winds.

2.3.2.3.2 Temperate Regions. Design and develop sites to balance the effects of seasonal thermal variations promoting both winter and summer cooling in terms of seasonal solar orientation and prevailing winds.
2.3.2.3.3 **Hot Arid Regions.** Design and develop sites to minimize solar heat gain and maximize shade and encourage humidity in outdoor spaces.

2.3.2.3.4 **Hot Humid Regions.** Design and site development to minimize solar heat gain and promote air movement and cross ventilation.

2.3.2.4 **Views and Vistas Standards.** The installation will be designed to preserve and enhance scenic and other attractive views and vistas, and to screen unattractive views and vistas.

2.3.2.5 **Vegetation Standards.** The installation will be designed to protect and preserve existing native vegetation. This preservation reduces maintenance and enhances sustainability.

2.3.3 **Manmade Conditions**

2.3.3.1 The following site planning standards will be used in designs for the installation:

2.3.3.1.1 Group buildings to so as reduce impact on the natural environment, by leaving as much undeveloped area undistributed as possible and by minimizing the support infrastructure such as roads and utilities. This shall be done in such a way as to accommodate all Force Protection requirements.

2.3.3.1.2 Locate large buildings that have an expansive foot print in relatively flat areas to reduce the cut and fill. Where topology is more sloping, orient buildings so as to run along contours. Preserve the natural vegetation and drainage to as great a degree as possible (Fig. 1-2.4).

2.3.3.1.3 Minimize solar heat gain for cooling and maximize solar heat gain and retention for heating.

2.3.3.1.4 Site buildings with consideration for the microclimate conditions of the site that result in variances in wind or light because of adjacent land forms, structures, or trees.

2.3.3.1.5 Orient outdoor pedestrian areas for the most comfortable exposure.

2.3.3.1.6 Utilize lighter colored building surfaces exposed to the sun and darker colors on recessed surfaces to absorb radiation.
2.3.3.1.7 Orient buildings as to take optimal advantage of views as well as climatic conditions affecting solar heat gain or shading.

2.3.3.1.8 Design and locate roads to provide a hierarchy of traffic carrying capacities.

2.3.3.1.9 Locate roads to blend with topography and vegetation.

2.3.3.1.10 Design and locate parking lots to minimize visual impact of broad expanses of pavement and vehicles (Fig. 1-2.5).

2.3.3.1.11 Design and locate pedestrian walkways and bicycle paths to fit the physical environment, and provide a comfortable pedestrian experience, limiting conflicts with vehicular traffic.

2.3.3.1.12 Locate trees and shrubs to buffer harsh natural conditions such as winter winds.

2.3.3.1.13 Provide deciduous material for sun in the winter and shade in the summer. Provide evergreen material for windbreaks for cold north winds.

2.3.3.1.14 Design and locate site elements to blend with and enhance the physical environmental.

2.3.3.1.15 Force Protection requirements will be designed and located to blend with the physical environment.

2.4 ARMY STANDARDS

2.4.1 The cited Army Standards shall be met.

- **Americans with Disabilities Act Accessibility Guidelines (ADAAG)**
- **Uniform Federal Accessibility Standards (UFAS)**
- **AR 200-2, Environmental Effects of Army Actions**
- **AR 210-20, Master Planning for Army Installations**
- **AR 415-15, Army Military Construction Program Development and Execution**
- **AR 420-70, Buildings and Structures**
2.5 REFERENCES

2.5.1 The following references are provided for guidance.

- **UFC 1-300-05A, Installation Support**
- **UFC 3-210-01A, Design: Area Planning, Site Planning, and Design**
- **UFC 3-210-06A, Design: Site Planning and Design**
- **UFC 3-210-10, Design: Low Impact Developing Manual**
- **UFC 3-230-15FA, Design: Subsurface Drainage Facilities for Airfields and Heliports**
- **UFC 3-230-16FA, Design: Drainage and Erosion Control Structures for Airfields and Heliports**
- **UFC 3-230-17FA, Design: Drainage for Areas Other than Airfields**
- **UFC 3-250-01FA, Design: Pavement Design for Roads, Streets, Walks and Open Storage Areas**
- **UFC 3-250-18FA, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas**
- **UFC 3-260-02, Design: Pavement Design for Airfields**
- **UFC 3-400-01, Design: Energy Conservation**
- **Whole Building Design**
CHAPTER 3
BUILDING DESIGN STANDARDS

3.1 INTRODUCTION

3.1.1 The Building Design Standards encompass the function and character of the buildings as well as the arrangement of buildings to one another and to their environment. Use architectural style, materials, and colors indigenous to the region. Preserve the historically and culturally significant structures to add to an installations character and provide a sense of heritage.

3.1.2 The Building Design Standards in this chapter are discussed as they help to define specific facility types and as they apply in general to the design of all facilities. The standards include:

3.1.2.1 Army Facility Type Standardization, and

3.1.2.2 Standards which apply to all facilities:

- Physical Security Requirements
- Structural Character
- Building Entrances
- Service Areas
- Accessibility
- Seismic Design
- Historic Preservation
- Renovations and Additions
- Plazas and Courtyards
- Building Maintenance
- Interior Design
- Mechanical Systems
3.1.3 Sustainability Standards

The Army Sustainability Standards shall be met as an integral part of all building design for new construction, sustainment, repair, and modernization to reduce construction, maintenance, and life cycle costs and to conserve energy. The following paragraphs discuss the SPiRiT and Leadership in Energy and Environmental Design – New Construction (LEED-NC®) sustainable rating to be met by FY programs.

3.1.3.1 Sustainable Project Rating Tool (SPiRiT). The SPiRiT rating of "Silver" is the current standard for all FY 06 MILCON vertical construction projects under design as of 18 March 2003. For all other FY 06 and MCA and all FY07 MCA projects, the minimum SPiRiT rating requirement is "Gold". See Deputy Assistant Secretary of the Army (Installation and Housing) Memorandum, dated 05 January 2006, subject: Sustainable Design and Development Policy Update – SPiRiT to LEED Transition, paragraph 3. (See Appendix D for a more complete discussion on Sustainable Design.).

3.1.3.2 Energy and Environmental Design – New Construction (LEED-NC®). For all FY 08 military vertical building construction and later year projects, the Army sustainable rating level standard is the US Green Building Council (USGBC), LEED-NC® Silver rating. See Deputy Assistant Secretary of the Army (Installation and Housing) Memorandum, dated 05 January 2006, subject: Sustainable Design and Development Policy Update – SPiRiT to LEED Transition, paragraph 2. LEED Project Checklists are available on the web at www.usgbc.org.

3.2 FACILITY TYPES STANDARDIZATION

3.2.1 Facility Types. The Army Standards unique to selected types of facilities follow. They will be used for new construction, as well as, Sustainment, Repair, and Modernization (SRM). The standards are listed in the order given for facility classes by AR 415-28 Real Property Category Codes. Only the Army Facilities Standardization Committee (AFSC) has authority to approve the standards, make changes, and authorize installation waivers. Requests for waiver or changes will follow paragraph 1.6. Appendix P provides each facility types office point of contact (POC), HQDA proponent, ACSIM POC, IMA POC, Center of Standardization POC, and HQUSACE POC.
3.2.2 Approved Army Standards. The AFSC has approved the Army Standards for each of the following facility types. The more detailed Army Facility Design Standards are also provided, where developed and approved, by the Army Facilities Standardization Sub-Committee (AFSS).

3.2.2.1 Operational and Training Facilities (Facility Category Code 100)

3.2.2.1.1 Company Operations Facilities (COFs) Standards.

3.2.2.1.1 The AFSC approved Army Standards for Company Operations Facilities (COFs) on 20 May 2004. These standards are effective starting with FY 06 MCA projects and must be applied to all construction of new COFs on all installations. These standards shall also be applied to FY05 MCA projects to as great a degree as practical. The AFSC must approve any planned changes from the COFs Army Standards. The COFs Army Standards incorporate the following characteristics:

- Battalion centric design
- Flexible design
- Enlarged lockers
- Increased interior space
- Covered exterior maintenance areas
- Enlarged arms vaults
- Non-sensitive item secure storage
- Consolidated showers
- Economy of Construction
- Proximity to unit motor pool

3.2.2.1.1.2 The AFSS approved the Standard Design for Company Operations Facilities (COFs). See Memorandum for Record, dated 6 July 2004, Standard Design for Company Operations Facilities approving the COF standard design. Also, see Company Operations Facility Standard Design for applicable drawings.

3.2.2.1.2 General Instruction Building (GIB) and Army Continuing Education System (ACES) Standards. The AFSC has approved standards for classroom facilities, which provide for flexibility in instructional use while accommodating all instructional needs as well as providing for administrative, special function use, and support space. Standard Design Criteria is also provided which defining spatial and functional requirements. All facilities shall be ADA compliant. See The Army Standard for General Instruction Building (GIB) and Army Continuing
Education System (ACES) Facilities and Memorandum for Record, dated 01 December 2004, Standard Design Criteria for General Instruction Building (GIB) and Army Continuing Education System (ACES) Facilities. No standard design has been approved.

3.2.2.2 Maintenance and Production Facilities (Facility Category Code 200)

3.2.2.3 Research, Development, Test, and Evaluation Facilities (Facility Category Code 300)

3.2.2.4 Supply Facilities (Facility Category Code 400)

3.2.2.5 Hospital and Medical Facilities (Facility Category Code 500)

3.2.2.6 Administrative Facilities (Facility Category Code 600)

3.2.2.7 Housing and Community Facilities (Facility Category Code 700)

3.2.2.7.1 Chapel, Religious Education Facility, Family Life Center. The AFSC approved Army Chapel Standard Definitive Design, dated April 2004, establishes three set chapel sizes and specifies the requirements for worship and activity areas, classrooms, and other unique features and criteria. The AFSS approved the Facility Design Team (FDT) standard designs for Chapels which incorporates the mandatory Army Standards for Chapel Construction and provide the recommended layout for the most efficient configuration of all the required elements. See The Army Standard for Chapel Construction – January 2004 and Memorandum for Record, dated 21 January 2004, subject: The Army Standards for Chapels.

3.2.2.7.2 Army Barracks Standards. The Army Barracks Modernization Program design criteria give commanders and contractors the direction to incorporate best business practices around a modular floor plan. The Army Barracks Master Plan, Appendix I, Army Barracks Standards, promote barracks with an appropriate balance between private and common areas. The Vice Chief of Staff of the Army (VCSA) specified the “New Army Barracks Construction Criteria” in his Memorandum Subject: New Barracks Construction Criteria, dated 11 July 2002 in which he strongly endorsed the new standards. The criteria were further revised in Memorandum, dated 1 May 2003, subject: Revised...
Barracks Construction Criteria, which makes the following four changes to the Army Barracks Standards:

- Establish the two-bedroom/one bath module as the standard module
- Require installation of a stove or cook top
- Require laundries in the barracks
- Eliminate the separate soldier community building

3.2.2.7.3 Army Barracks Furnishings

3.2.2.7.3.1 Acquisition of new furnishings will be planned and accomplished in concert with the facility design and construction schedule so that delivery of the new furnishings coincides with the Beneficial Occupancy Date (BOD).

3.2.2.7.3.2 The Army Interior Design Manual (IDM) for Single Soldiers provides standards and processes to help furniture managers prepare order packages. The manual uses standard Army furniture specifications; i.e. medium oak wood furnishings or acceptable wood/steel alternatives; construction and fabric specification, and specific information for authorized items of furniture. The manual also contains standards for living/sleeping room arrangements, and SCB plans with color schemes. The manual includes information on the procurement process, order forms, and final inspection checklist. Waivers or changes must follow paragraph 1.6.

3.2.2.7.4 Dining Facilities (DEFAC). Dining Facility (DEFAC) standards can be viewed on the web at ProjNet.

3.2.2.7.5 Child Development Centers (CDC). Child Development Centers are intended to serve two juvenile groups: ages 6 weeks to 5 years; and 6 to 10 years.

3.2.2.7.5.1 CDC facilities for newborns and small children 5 years of age shall conform to Appendix G, Child Development Center of TI 800-01, Design Criteria. There are seven (7) design packages which include child capacities of 60, 99, 122, 145, 198, 244, and 303 children. (See ProjNet design packages).

3.2.2.7.5.2 CDC facilities for ages 6 years to 10 years shall conform to Army Standards for Child Development Center Construction (for school-age children) October 2004 per Memorandum for Record, Subject: Memorandum for Record, dated 19 October 2004, subject: Army Standards for Child Development Centers. The AFSC approved Standard Designs for
four CDC facility designs. The four designs are predicated on child capacity and entail the following four designs: (1) **105-135 child capacity**, (2) **150-180 child capacity**, and (3) **195-225 child capacity**, and (4) **60-65 child capacity (Wing Addition)**.

### 3.2.2.7.6 Family Housing

#### 3.2.2.7.6.1 Residential Communities Initiative (RCI)

3.2.2.7.6.1.1 The intent of the Residential Communities Initiative (RCI) is to improve the housing for military families by providing quality housing, built in attractive neighborhoods.

3.2.2.7.6.1.2 To ensure a uniform level of quality throughout the Residential Communities Initiative (RCI), Headquarters, Department of the Army has developed the “**Standards for Housing at RCI Projects - Update # 2**”. These standards apply to the construction, renovation, and condition of privatized housing. Compliance with these standards is mandatory unless the Department of the Army (DA) Residential Communities Initiative (RCI) office approves a waiver in writing. These standards apply to RCI projects with Community Development and Management Plan (CDMP) collaboration contracts awarded after January 1, 2005 and are not retroactive to previous projects.

3.2.2.7.6.1.3 All RCI projects planned or under design will meet the "Gold" SPiRiT rating (See **Memorandum, dated 05 January 2006, subject: Sustainable Design and Development Policy Update – SPiRiT to LEED Transition**, paragraph 4.).

3.2.2.7.6.1.4 **Installation Design Guides (IDG) and RCI Projects.** RCI projects will apply installation practices and policies to RCI projects. Paragraph 3(b) of the “**Standards for Housing at RCI Projects - Update # 2**” reads; “Many installations have published guidelines and construction standards (e.g. Installation Design Guide) that may exceed or differ substantially from local codes and standards. It is DA RCI’s intention that installation practices and polices apply to RCI projects unless waived by appropriate installation authorities. If an installation guideline or standard appears unreasonable for an RCI project and a consensus solution cannot be reached at the installation level, DA RCI may be consulted in resolving the conflicting standards.”

### 3.2.2.7.7 Army Lodging

3.2.2.7.7.1 The AFSC has approved The Army Standard for Army Lodging. These standards promote economies in serving the
Army traveler, but not at the expense of quality or service. The standards define the facilities and the level of service the Army traveler should expect when they travel to an Army installation. The facility standard and level of service will be consistent from installation to installation. See The Army Standard for Army Lodging and Memorandum for Record, Subject: Memorandum for Record, dated 14 December 2004, subject: Army Standards for Army Lodging.

3.2.2.8 Utilities and Ground Improvements (Facility Category Code 800)

3.2.2.8.1 Access Control Points (ACPs) (Also see paragraphs 4.8 and 7.7.).

3.2.2.8.1.1 The AFSC has approved The Army Standard for Access Control Points (ACPs). The standard provides detailed criteria for the development of entrance facilities and appurtenances within, and related to, the ACP corridor, which will be understood to include the secured area between the entrance gate and the final set of vehicle barriers. Criteria shall be concerned with all aspects of Force Protection in regard to vehicular and pedestrian access to installations, safety, optimum working conditions for personnel, and the defeat of any threat to installation security. (See UFC 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points, The Army Standard for Access Control Points (ACPs), and Memorandum for Record, subject: Memorandum for Record, dated 14 December 2004, subject: The Army Standard for Access Control Points.

3.2.2.8.1.2 The AFSS approved the ACP Design on 14 December 2004 (See Standard Definitive Design for Access Control Points.).

3.2.3 Interim Army Standards. The Army Standards for the following facility types are to be developed for approval by the AFSC. The current facility design criteria, where available, are provided to use in the interim. Only the AFSS has authority to make changes or authorize installation waivers.

3.2.3.1 Operational and Training Facilities (Facility Category Code 100)

3.2.3.1.1 Range Standards. The Army Sustainable Range Program (SRP), proponent is HQDA Office Deputy Chief of Staff, G3/5/7 (DAMO-TRS), phone number (703) 692-6410. The SRP develops and manages standard designs for Army Ranges in accordance with AR 350-19 and Training Circular (TC) 25-8.
Training Ranges. The Range Standards are available on the following links:


3.2.3.1.2 Army Reserve Center/National Guard Facilities. Design guidance can be found in UFC 4-171-05, Design: Guide for Army Reserve Facilities.

3.2.3.1.3 Battalion / Brigade Headquarters. Construction design criteria for COFs can be viewed on the web at ProjNet.

3.2.3.1.4 Deployment Facilities

3.2.3.1.5 Military Operations Urban Terrain (MOUT) Facility

3.2.3.1.6 Training Range Suite

3.2.3.1.7 Operational Readiness Training Complexes

3.2.3.1.8 Close Combat Tactical Trainer (CCTT) Battle Simulator

3.2.3.1.9 Criminal Investigation Facility (CIDC)

3.2.3.1.10 Information Systems Facility

3.2.3.2 Maintenance and Production Facilities (Facility Category Code 200)

3.2.3.2.1 Tactical Equipment Maintenance Facilities (TEMF)

3.2.3.3 Research, Development, Test, and Evaluation Facilities (Facility Category Code 300)

3.2.3.4 Supply Facilities (Facility Category Code 400)

3.2.3.4.1 Hazardous Material Storage Facilities

3.2.3.4.2 Central Issue Facility

3.2.3.4.3 General Purpose Warehouse
3.2.3.5 **Hospital and Medical Facilities** (Facility Category Code 500)

3.2.3.5.1 United States Army Health Facility Planning Agency, **Interior Design Master Plan** (see links below). Army Medical Command (MEDCOM).

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3.2.3.5.2 **Medical Military Facilities.** Design guidance is provided in **UFC 4-510-01, Design: Medical Military Facilities.**

3.2.3.6 **Administrative Facilities** (Facility Category Code 600)

3.2.3.6.1 **Military Entrance Processing Command Facility**

3.2.3.7 **Housing and Community Facilities** (Facility Category Code 700)

3.2.3.7.1 **Unaccompanied Officer & Senior Enlisted Quarters**

3.2.3.7.2 **Morale, Welfare, and Recreation (MWR) Branded Theme Operations**

3.2.3.7.2.1 The Army Community and Family Support Center (CFSC) through its Theme Operations, offers comprehensive theme packages pertaining to restaurants and entertainment centers. The packages are customized to the installation. The CFSC will conduct an assessment for market viability, provide architectural designs, and other promotional items. Information on the CFSC Branded Theme Operations to include how to get a
theme operation, management support, and food service support is located on the CFSC website at the Army Brand Theme Operations Home Page.

3.2.3.7.3 Physical Fitness Centers

3.2.3.7.4 Fire Stations

3.2.3.7.5 Bowling Center

3.2.3.7.6 Youth Centers

3.2.3.7.7 Outdoor Sports Facility

3.2.3.7.8 Army Community Service Centers

3.2.3.7.9 Basic Combat Trainee Barracks (BCT)

3.2.3.7.10 Advanced Individual Training (AIT)

3.2.3.7.11 Reception Barracks

3.2.3.7.12 Clubs / FBE Facilities

3.2.3.7.13 Golf Courses

3.2.3.7.14 Recreational Lodging

3.2.3.8 Utilities and Ground Improvements (Facility Category Code 800).

3.3 PHYSICAL SECURITY REQUIREMENTS

To assure the required physical measures are met the installation Provost Marshall or Physical Security Officer will be coordinated with during the planning, design, and construction of all projects per AR 190-13, paragraph 1-26. See Chapter 7, Force Protection for a more detailed discussion regarding Antiterrorism measures.

3.4 BUILDING DESIGN STANDARDS

3.4.1 The following standards apply to all Army facilities.

3.4.2 Design concept standards follow:

3.4.2.1 Develop a coherent architectural style that results in the blending of new and old structures.
3.4.2.2 Design buildings to include more floors in a vertical structure that results in a smaller footprint and more efficiently utilizes limited installation land areas.

3.4.2.3 Combine multiple activities in one building to reduce the number of buildings required and more efficiently utilize limited installation land areas.

3.4.2.4 Design multiple use facilities with the clear span structural and mechanical system capability to quickly change interior layouts to accommodate changing requirements.

3.4.2.5 Use indigenous construction materials and practices that require less energy to produce and transport and may be recycled at the end of their usefulness (Fig. 1-3.1).

3.4.2.6 Locate windows to maximize natural light, ventilation and outward views.

3.4.2.7 Buildings which are no longer needed for their initial mission function but which are in sound condition will be adapted for a suitable mission function reassignment. For Army directives concerning building re-use as well as deconstruction see Memorandum, dated 31 August 2001, subject: Management of Construction and Demolition (C&D) Wastes.

3.5 STRUCTURAL CHARACTER STANDARDS

3.5.1 The character of installation architecture varies according to the use of the structure and when it was built. This use and age variation can result in character incompatibilities. The difference in character may also result when the designer ignores the character and scale of adjacent buildings or uses an imitative technique unsuccessfully. It is critical that the coordination of structural character on an installation provides a consistent and coherent “sense of order” and “sense of place”. The standards for relationship of design comes from using compatible scales, massing, form, color, texture, materials, and fenestration which follow.

3.5.2 Scale. Scale refers to the size of a building facade in relation to humans. Buildings that include predominant vertical facades, which dwarf the individual, are defined as monumental in scale. Buildings with more horizontal facades designed to relate more to the size of the human figure are defined as human scale (Fig. 1-3.2). The scale of most buildings on installations should be more human than monumental. All new construction will be
compatible in scale with adjacent buildings. Monumental architectural design is typically utilized for more ceremonial buildings, such as worship centers, headquarters complexes, and hotel facilities. These buildings make use of large, glazed areas at entrances and oversized fenestration elements to create a scale appropriate to the building’s use. Scale and relief will be provided through roof form, fenestration, building articulation and landscape plantings.

3.5.3 Massing. Massing refers to the overall bulk or volume of a building or buildings (Fig. 1-3.3). The size and proportion of the individual buildings in a grouping of buildings will be designed to be proportionally compatible with the adjacent structures.

3.5.4 Form. The form of a building is determined by its size, mass, shape and proportions. Use similar building forms to provide continuity to the installation architectural impact.

3.5.5 Color. Use the geographical area color scheme consistently throughout the installation, as specified in the Army Standards Color Palette in Appendix L, which will result in a continuity of buildings and contribute to a “sense of place”. Army Standards Color Palettes have been developed for specific geographical areas giving consideration to climate, geography, culture, facility function, historical context, architectural character, etc.

3.5.5.1 Colors to match the standards will be implemented during normally scheduled paint cycles (See Appendix L, Exterior Color Charts.) (Fig. 1-3.4).

- Relate buildings with compatible material and similar colors.
- Select colors for material from the Army Standards Color Palette based on the desired function, appearance, attractiveness of the building, and its compatibility with adjacent building colors.
- Limit exterior building colors to the Army Standard Color Palette. This provides each area a coordinated palette of similar colors that are subdued and harmonious. Avoid the misuse of strong, loud colors.

3.5.5.2 Historic Buildings. Repaint the building or structure to match the existing colors or colors that can be historically documented.
3.5.5.3 **Painting Procedures.** Surface preparation and paint application shall be as specified in TM 5-618 and UFGS-099000. Painting Records shall be maintained as specified in TM 5-618.

3.5.6 **Texture.** Use of similar texture in buildings to provide visual continuity for the visual zones of an installation.

3.5.7 **Materials.** Use similar materials in the exterior finish and trim of buildings to provide visual continuity for the same visual zone. Building materials make a major contribution to the scale, color, texture, and character of a military installation. A limited palette of durable, low maintenance materials will be used that, while encouraging a variety of expression, provides a cohesive and consistent architectural character through the installation and within each visual zone. Material will reflect the function of a building and its hierarchy within the installation. Use the following standards when selecting exterior building materials.

3.5.7.1 Choose materials for their longevity and maintenance characteristics.

3.5.7.2 Use materials with integral colors to avoid painting.

3.5.7.3 Use pre-finished material where possible for gutters, window frames, doorframes, etc.

3.5.7.4 Use blended colors on pitched roofs.

3.5.8 **Fenestration.** Building fenestration includes features such as doors, windows, shading devices, and building decoration details. These features should be similar in arrangement, design, size, and proportion for architectural compatibility and visual consistency and continuity.

3.5.9 **Gutters and Roofing**

3.5.9.1 Buildings with pitched roofs (that is, roofs designed to channel water over the roof edge to the eaves) will utilize gutter and downspouts to control rainwater runoff. UFC 3-130-07, *Design: Arctic and Subarctic Construction - Buildings*, will apply where appropriate.

3.5.9.2 All roofing shall be designed with positive drainage. Flat roofs without slope are not permitted.
3.5.10 **Awnings and Canopies.** Awnings and canopies are authorized to protect entrances, interior surfaces, and personnel from the effects of weather. Refer to [AR 420-70](#).

3.5.11 **Locks and Locking Devices.** The implementation guidance for programmable electronic key card access systems policy memorandum issued 14 December 2004 is in the next two paragraphs. The basic memorandum requires the use of electronic, programmable electronic key card access systems for all new construction and major building renovations. See Memorandum for Record, Subject: [Memorandum for Record, subject: The Army Standards for Electronic Key Card Access for all Facilities](#).

3.5.11.1 Beginning in FY07, electronic key card access systems must be included in projects for facility types listed in paragraph 3.5.11.2. Electronic key card access systems will be treated as real property and are subject to normal work classification regulations. Access systems will be funded using MILCON or operation and maintenance construction or repair appropriations. Once technical implementation guidance is developed and published, all proposed FY06 and Congressional add projects that are less than 35% designed will be evaluated on a case-by-case basis to determine if electronic key card access systems should be incorporated.

3.5.11.2 Technical implementing guidance will be developed by HQDA and fielded by December 2005. The intent of the current policy memorandum is to utilize hotel room type card access systems on interior and exterior doors where keys are provided to successive tenants over the life of the building. The priority for implementation is Unaccompanied Enlisted Personnel Housing, Transient Lodging, Officers Quarters, Operational Readiness Training Complexes, Battalion/Brigade Headquarters, Company Operations Facilities, Tactical Equipment Maintenance Facilities, and Administrative Buildings.

3.5.11.3 Each Army installation will develop a master plan for the Electronic Key Card Access system. The master plan should specify that all buildings will use equipment from a single manufacturer so that there is consistency, compatibility, and sustainability across installed Electronic Key Card Access equipment. Each installation will be responsible for obtaining the appropriate sole source justification for their installation in coordination with the IMA region.

3.5.11.4 In keeping with the Transient Lodging Standards, spaces for access by Directorate of Public Works personnel may retain key systems until a project for full conversion of all DPW
access can be executed. If a new building is being built on an installation that already has electronic key card access equipment on existing buildings, the requirement for a single-type or compatible equipment for the whole installation serving both existing and new facilities should be implemented.

3.6 BUILDING ENTRANCES

A building entrance is a primary feature of any building design. Define the entrance to be recognizable as the point of entry regardless of the size or importance of the building (Fig. 1-3.5). The main entrance to a building will be in a prominent location and will be oriented toward the primary adjacent public spaces such as a courtyard, lawn, parking lot, or street. The details of an entrance will be designed to provide continuity with other entrances to the building and the entrances of adjacent buildings.

3.7 SERVICE AREAS

Service areas, such as loading docks, utility access/equipment, and trash dumpsters will be screened from the views of primary use areas such as entrances, courtyards, gathering areas, streets, and parking lots. Also, these areas will be screened as an enclosure by using walls and landscaping (Fig. 1-3.6). Screen walls should be between six and eight feet high and will be in harmony with the adjacent building. Trash and garbage collection areas must be located a minimum of 25 meters (82 feet) from troop billeting, family housing areas containing more than 12 military quarters, and stand-alone retail facilities. They will be placed a minimum of 10 meters (33 feet) from all other inhabited structures (UFC 4-010-01, Table B-1).

3.8 BUILDING ACCESSIBILITY

3.8.1 Uniform Federal Accessibility Standards (UFAS) established by public law requires any DoD building or facility used only by able-bodied personnel need not be accessible to the disabled. Nevertheless, when feasible and appropriate, seek to incorporate accessibility measures into the design since the facility use may change over time (military exclusion is provided in paragraph 4.1.4 [2] of UFAS. In particular, the following facilities need not be designed to be accessible: unaccompanied personnel housing, closed military dining facilities, vehicle and aircraft maintenance facilities.

3.8.2 All other structures or facilities must meet the standards of the Americans with Disabilities Act Accessibility Guidelines.
(ADAAG) and the UFAS, with the most stringent standards applied in the event of conflicting guidelines. (See AR 420-70, Chapter 2, Para 2.8.).

3.9 SEISMIC POLICY

3.9.1 The minimum performance objective for Army facilities is Life-Safety. To ensure compliance, seismic evaluations and mitigation of unacceptable seismic risks shall be performed. Higher levels of protection for mission essential facilities will be considered in evaluations.

3.9.2 Seismic Evaluation. Standards for the seismic evaluation of existing facilities are given in AR 420-70. During alteration, renovation, or improvement of an existing building, a seismic evaluation shall be performed in accordance with the provisions of ASCE 31-03, Seismic Evaluation of Buildings, when:

- A change in facility use causes a change in occupancy or importance to a higher Seismic Use Group, as defined in Table 1604.5 of the 2000 International Building Code (IBC 2000).
- A project will significantly extend a facility’s useful life through alterations or repairs, or will significantly increase a facility’s value, and the cost exceeds 30% of the current replacement value of the facility.
- A facility is damaged to the extent that significant structural degradation of its vertical or lateral load carrying system has occurred.
- A facility is deemed an exceptionally high risk to occupants or to the public.
- A project is planned which causes the capacity of a facility’s structural system or components to be reduced to 90 percent or less of original stability or strength.
- A building is added to the Army inventory through purchase or donation.

3.9.2.1 Exceptions to Seismic Evaluations. An existing building may be exempted from the seismic evaluation requirements given above if:

- It is located in a region of Low Seismicity, having $S_{DS} < 0.167g$ and $S_{D1} < 0.067g$, unless it is designated as mission essential. $S_{DS}$ and $S_{D1}$ are defined in paragraph 1615.1.3 of the IBC 2000.
• It is a detached one or two family dwelling, two stories or less located where $S_{DS} < 0.40\text{g}$.

• It is a detached one or two family dwelling, two stories or less located where $S_{DS} \leq 0.40\text{g}$, if it meets the light-frame construction requirements of the FEMA 368/369, 2000 NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures.

• It is intended only for minimal human occupancy and is occupied by people for a total of < 2 hours per day.

• It is of one-story light-frame or wood construction, with a floor area < 3,000 square feet (280 square meters).

• It is a “post-benchmark” building as defined in Table 1-1 of ICSSC RP 6, NISTIR 6762, Standards of Seismic Safety for Existing Federally owned or Leased Buildings, or its original design was done according to the provisions of the 1982 or later edition of TM 5-809-10, Seismic Design for Buildings, or the 1988 or later edition of TM 5-809-10-1, Seismic Design Guidelines for Essential Buildings. To satisfy this exemption, the building must comply with all structural, non-structural, foundation, geologic site hazard, and adjacency compliance categories of the applicable building codes.

• It was designed and constructed for the Federal Government after the date of the adoption of Executive Order 12699 (05 January 1990), and it was designed in accordance with ICSSC PR 2.1A, Guidelines and Procedures for Implementation of the Executive Order on Seismic Safety of New Building Construction.

• It is scheduled for replacement or demolition within 5 years.

• It has already been seismically rehabilitated in compliance with the provisions of ICCSC RP4, NISTIR 5382, Standards of Seismic Safety for Existing Federally Owned or Leased Buildings.

• It is a special structure, such as a bridge, transmission tower, industrial tower or equipment, pier, wharf, or hydraulic structure.

3.9.3 Seismic Rehabilitation. If the seismic evaluation process indicates the earthquake resistance of an existing facility does not meet Life-Safety or applicable higher performance objectives established for the facility, appropriate mitigation of the risk must be performed. The mitigation method will be selected in consonance with the MACOM and installation commander.
Mitigation alternatives include rehabilitation of structural, non-structural, and geologic hazards; facility abandonment; and reduced occupancy category for the facility. If structural, non-structural, or geologic rehabilitations are the chosen mitigation measures, design and detailing will be done in accordance with FEMA 356, *Prestandard and Commentary for the Seismic Rehabilitation of Buildings*, and UFC 3-301-05A, *Design: Seismic Evaluation and Rehabilitation for Buildings*.

**NOTE:** ASCE is currently in the process of developing a national standard that is based on FEMA 356. When it is produced it will replace FEMA 356 and new DoD UFC will replace TI 809-05.

3.9.4 **New Facilities or Additions or Extensions of Existing Facilities.** New facilities and additions or extensions of existing facilities will be designed to provide the level of seismic protection required by UFC 1-200-01, *Design: General Building Requirements*; the 2000 International Building Code (IBC 2000); UFC 1-300-05A, *Installation Support*, and UFC 3-310-03A, *Design: Seismic Design for Buildings*.

**NOTE:** In late FY04 or early FY05, the 2003 International Building Code (IBC 2003) and UFC 3-310-04, Seismic Design for Buildings will replace the IBC 2000 and TI 809-04, respectively.

3.10 **HISTORIC ARCHITECTURE**

3.10.1 The visual integrity of historic buildings or districts on the installation will be preserved and protected. The Army’s management of historic properties is pursuant to the duties and responsibilities established by Congress under the National Historic Preservation Act (NHPA). The NHPA also created the National Register of Historic Places as the official listing of the nation’s historic properties considered worthy of preservation. See Appendix M, Historic Preservation.

3.10.2 For further standards see AR 200-4 and DA Pam 200-4. Specific requirements and recommendations for the treatment of historic properties are available in the National Park Service’s *Secretary of the Interior’s Standards for the Treatment of Historic Properties*. A working awareness of historic preservation policies and procedures followed by the Army can be found in the TI 800-01, Chapter 16, *Preservation of Historic Structures*. 
3.11 RENOVATIONS AND ADDITIONS

When existing buildings are renovated or additions are constructed, the architectural character of the renovation or addition will be compatible with the architectural character of the existing building and the adjacent buildings. This compatibility includes the use of materials, color, shape, size, scale, and massing in the addition or renovation that blends with the architectural character of the existing structure. For historical structures, see paragraph 3.10 above.

3.12 PLAZAS AND COURTYARDS

Plazas and courtyards should be located as part of the primary entrance to a building, or as an extension of non-primary entrance areas to the outside (Fig. 1-3.7). Wide, paved entrance plazas need vehicular barriers.

3.13 BUILDING MAINTENANCE

Buildings designed and constructed to incorporate sustainable design criteria will minimize life cycle, energy and maintenance costs through proper selection of forms, materials, and construction details.

3.14 INTERIOR DESIGN STANDARDS

3.14.1 Inhabited spaces, that require the selection of furnishings or equipment, will be designed by professional interior designers.

3.14.2 Interior design is required on building construction and renovation projects regardless of the funding source. Interior design standards follow.

3.14.2.1 **UFC 3-120-02AN, Design Guide: Interiors.**

3.14.2.2 See Medical Interior Design Standards, paragraphs 3.2.6.1 and 3.2.6.2.

3.14.2.3 **Family Housing.** Interior design for family housing will be in accordance with **UFC 4-711-02A, Design: Family Housing.**

3.14.3 **Interior Design**

3.14.3.1 Space planning of building interiors is the basic building block of the facilities program for administration and operational facilities.
3.14.3.1.1 **AR 405-70** (Appendix D) provides numerical planning allowances standards and addresses the quantities for programming space for personnel and equipment. Space planning takes into consideration the following; who will be using a space, how this space will be used, what activities will take place there, and the interaction of other people in the building.

3.14.3.1.2 The Facility Planning System (FPS) provides military planners with the means to compute facility space allowances for 31 category codes for TOE units and 44 category codes for TDA organizations. These categories represent the most frequently occurring unit-driven facilities. FPS also provides the means to compute allowances for installation warehouses (5 category codes). Computations are based upon the Table of Organization and Equipment (TOE) or the Table of Distribution and Allowances (TDA) for each organization examined. Facility allowances are calculated in accordance with current Army planning criteria as provided in the Army Criteria Tracking Systems (ACTS).

3.14.3.1.3 The ACTS provides a single source of the facility planning criteria at the Category Code level used in the Army legacy facility planning systems, Facility Planning System (FPS) and Real Property Planning and Analysis System (RPLANS). ACTS is the Army’s repository of consolidated space planning and utilization criteria with references to sources of design criteria and RPLANS. The system aids planners, programers, and space utilization managers of facilities requirements at installation and DA levels. Also see **AR 140-483** and **NG Pam 415-12** for the Army Reserve and Army National Guard for facility planning criteria respectively.

3.14.3.1.4 An increase in space allowances in excess of 10% must be approved by the IMA designated staff for the Active Component and IMA-ARD for the Army Reserve.

3.14.4 **Interior Color.** Standards for color and light, optical effects, basic color theory, color schemes, and application of color in facilities are in Corps of Engineers, **UFC 3-120-02AN, Design Guide: Interiors,** Chap. 3, Light and Color and in the **Air Force Interior Design Guides,** Chap. 9, Color Principles, **Part 1** and **Part 2**.

3.14.5 **Acoustics.** The interior designer will reduce unwanted noise and preserving desirable acoustics in a space. Control sound in the following three ways: eliminate the source; isolate the source, i.e. provide a barrier between the user and the source; or mask the offending sound. The criteria for dynamics and control of
acoustics are in UFC 3-120-02AN, Design Guide: Interiors, Chap. 5. See also AR 420-70.

3.14.6 **Interior Lighting**

3.14.6.1 Artificial lighting and natural daylight will be incorporated into designs taking into consideration the work activities involved. Always supplement overhead lighting with task lighting and use architectural lighting in entrances, corridors, waiting rooms, and other spaces to light artwork and provide interest.

3.14.6.2 Army installation buildings shall provide a high quality lighting environment. The lighting equipment/systems selected must satisfy both performance and aesthetics (Fig 1-3.8). Factors for consideration in this selection will be based on the following characteristics: glare, lumens per watt, color temperature, color rendering index, life and lumen maintenance, availability, switching, dimming capability, cost, and natural day lighting.

3.14.6.3 Follow the lighting design approaches and lighting applications found in the following publications:

- TI 811-16, Lighting Design.
- UFC 3-520-01, Interior Electrical Systems, Appendix F.

3.14.6.4 Lighting Maintenance, Types, and Problem Solving. Lighting maintenance, types, and lamp trouble-shooting is found in reference publication TM 5-683, Chapter 9.

3.14.7 **Finishes.** Finishes will be selected on the basis of function, sustainability characteristics, durability, maintainability, life cycle cost, and low/no emissions. Interior finish standardization is important for administrative and financial reasons. Standardization presents a unifying element throughout all buildings that is more cost effective, efficient, and easy to maintain.

3.14.7.1 Flooring and Floor Coverings. The standards for installation, maintenance, and repair of flooring are contained in AR 420-70. See also reference publications TM 5-618 and TM 5-620.
3.14.7.1.1 Carpeting. Carpeting is an inappropriate treatment for stairs, and will not be used without IDS waiver approval. See paragraph 1.6. Carpeting will be avoided in high traffic areas. Where use is appropriate, carpet shall meet standards specified in UFGS 096800, Carpet.

3.14.8 Interior Furnishings. Furnishings are elements added to a building for utility or ornamentation. These include furniture such as chairs, desks, sofas, and tables and also cabinetry, window treatments, signage, accessories, art, and plants. Selections of furnishings will take into consideration the compatibility of the furniture and other component designs with that of the finishes and architectural style. Selections must be an integral part of the overall concept to ensure coherency between architecture, materials, furniture, art, and signage.

3.14.8.1 Furniture. Furniture systems are a wide range of furniture types comprised of components to create a custom designed work environment to meet specific functional needs. Furniture includes seating and case goods. Case goods are furniture elements constructed from box-like components. These include desks, credenzas, file cabinets, etc. Case goods fall under two major categories: conventional and modular. Conventional case goods are delivered as pre-assembled, ready-to-use products. Modular case goods are manufactured as separate pieces that may be grouped into a number of different arrangements.

3.14.8.1.1 Systems Furniture. Systems furniture will be ergonomically designed to meet a variety of functions, conditions, and requirements. Power and communications requirements must be determined and planned so they are available at the locations where they are needed. Provisions for furniture systems electrical and data requirements must be made part of the construction documents.

3.14.8.1.2 Budgeting for Furniture Systems. Furniture systems represent a significant percentage of a project cost. Furniture systems are O&M funded and will be included in the project scope along with such items as built-in casework. Furniture systems are listed on the DD Form 1391 as a non-add entry in Block 9 for "Equipment Provided for Other Appropriations". In Block 12b, the furniture systems will be as an O&M funded item, the fiscal year the funds are requested, and the line item cost. Accessories can amount for a significant portion of the furniture systems package and will be budgeted with the basic system components.

3.14.8.1.3 Systems Furniture Design Standards
3.14.8.1.3.1 General:

- Plan new systems furniture to consider the condition and appearance of existing paint, wall coverings, carpet, and base of the area.
- Plan the location of office equipment and break areas. Do not place heat generating devices, such as coffee makers or copiers, near a thermostat.
- Circulation paths will be clear, accessible for disabled individuals, and easy to navigate. See paragraph 3.8.
- Design systems furniture layouts to include:
  - Function of the office.
  - Adjacencies of personnel and activities.
  - Meeting and conference room requirements.
  - Individual storage needs.
  - Areas for common use office equipment such as the copier and fax.
  - Reception area with waiting and guest seating space.
  - Special furniture or needs of a particular office, such as drafting tables or extra storage space.
  - Communications equipment.
  - Task lighting, daylight, and ambient lighting.
  - Special security requirements.
  - Budget constraints.
  - Flexibility to allow future changes.
  - Schedules of design, delivery, and installation.
  - Air conditioning, air quality.
  - Acoustic performance requirements.

3.14.8.1.3.2 Panel Standards

- Use full height panels only in areas with a specific need for increased privacy or separation, such as conference rooms, break areas, and certain private offices.
- Provide glass or openings in panels in corners to open up the space and allow natural light to filter into the center of the space.
- Do not install panels in front of windows, as they will block natural light for the entire area. Panels installed perpendicular to windows should be installed at a window mullion.
- Provide access panels in the systems furniture to allow for communications connection.
- The location and use of panels taller than 168 centimeters (66 inches) must be carefully planned and
coordinated to avoid interfering with the proper functioning of air conditioning diffusers, fire sprinklers, smoke detectors, lighting fixtures, switches, thermostats, and sensors.

- Panels will not block service access to mechanical, electrical, or telephone equipment.

3.14.8.1.3.3 Color and Texture of Systems Furniture

- The style and types of systems furniture will be consistent throughout the area.
- The materials and colors of the panels and chairs will be durable, heavy-duty, and stain resistant.
- The fabric on the systems furniture and chairs will harmonize with the overall building color scheme.

3.14.8.2 Window Treatments Standards

3.14.8.2.1 Window treatments will complement and support the interior design of a space. Window treatments serve many purposes in an interior environment. They provide privacy, light and sun control, reduce energy consumption, and decreased sound transmission. The type of treatment, as well as the type of material used, determines the effectiveness of the treatment in any given instance. The following will be standard when selecting fabric type:

- Sheer or semi-sheer fabrics will provide minimum privacy, shade, and energy conservation.
- Heavy, opaque fabric and hard treatments will be used only where total light exclusion is required.
- Full, soft treatments may be used to absorb sound.

3.14.8.3 Interior Signage Standards

3.14.8.3.1 Signage will be informational, directional, or regulatory. Informational signage provides the user with information and includes room or area labels, bulletin boards, menus, artwork descriptions, and emergency information. Directional signage directs circulation and provides orientation. It includes entry directories, directional arrows, and maps. The purpose of regulatory signage is control: providing prohibitions, warnings, emergency instructions, and use restrictions. Standards for interior signage are in TM 5-807-10.
3.14.8.4 Interior Accessories. Accessories may be either functional or decorative. Accessories will make a room appear inviting and personal.

3.14.8.4.1 Functional Accessories. This group of accessories will be selected for functional, utilitarian aspects, as well as aesthetic qualities that may contribute to the total design concept. These accessories include letter trays, coat racks, lamps, product displays, magazine racks, brochure racks, trash and recycling containers, and message boards.

3.14.8.4.2 Decorative Accessories. Decorative accessories are objects such as artwork and plants.

3.14.8.4.2.1 Art. The designer will work closely with the user to determine placements that are satisfactory for both functional and visual composition. The preparation of artwork to be displayed and positioned in an interior space involves many important decisions. Some of the factors to be taken into consideration in the selection of are (Fig. 1-3.9):

- Quality (posters, prints, original art)
- Subject matter
- Medium (photography, paper, oil, etc.)
- Size
- Placement
- Method of display (permanent collection or rotating program)
- Lighting
- Integration with design scheme

3.14.8.4.2.2 Plants for Building Interiors

3.14.8.4.2.2.1 Use plants for focal points, screens, and for their psychological effect. Incorporate plants into the interior environment for the health and well-being of the user, as well as enrichment of the space.

3.14.8.4.2.2.2 Select plants, based on their light, water, and temperature needs, continuing care requirements, and ease of replacement. Plants will not be positioned so that their location presents a problem when watering.

3.14.8.4.2.2.3 Detailed standards on interior planting including design considerations (light requirements, temperature, atmosphere considerations, and planters), plant maintenance, and a listing of recommended plants can be found in the Air Force Landscape

3.14.8.6 **Army-wide Furnishings Standards.** The Army-wide Furnishings Standards are under development and will become an integral part of the Army Installation Design Standards web portal located on the web at [https://www.idsarmy.hqda.pentagon.mil/Army_IDS/](https://www.idsarmy.hqda.pentagon.mil/Army_IDS/).

3.14.9 **Interior Operations Policies.** Installations shall follow interior operations and appearance policies in Appendix N, Housekeeping Rules and Interior Appearance Policies (Examples). To preserve the quality of facilities, operations policy is set between the user and the installation management. The user is responsible for preserving the visual appearance of the facility, and installation management is responsible for providing maintenance needed to preserve facility quality.

## 3.15 MECHANICAL SYSTEMS

3.15.1 This section shall consist of Plumbing and HVAC systems. The standards are being developed.

## 3.16 ELECTRICAL AND COMMUNICATIONS SYSTEMS AND THEIR DISTRIBUTION

### 3.16.1 Electrical Power

Design standards for interior electrical systems are found in UFC 3-520-01, Interior Electrical Systems. Compliance with this UFC is mandatory for the design of interior electrical systems. This UFC establishes:

- Criteria for the design of interior electrical systems.
- System-level design criteria.
- Facility-level criteria for interior electrical systems.
- Provides a starting point for determining the applicable design criteria for a facility.
- Facilities outside the United States must comply with the applicable host nation standards; refer to UFC3-510-01-ANF, Design: Foreign Voltages and Frequencies Guide.
3.16.2 Communications

Communication systems handle the transport of telephone and data networks (i.e. video, multimedia, teleconferencing, data transfer, facsimile transmission, and voice communications). The design criteria for the planning, design, and implementation of the Installation Information Infrastructure Architecture (I3A) for Army installations in the Continental United States (CONUS) is provided in the United States Army Information Systems Engineering Command Technical Guide for Installation Information Infrastructure Architecture. The guide is located on the web, search for I3A on the Army Knowledge Online (AKO) web portal. I3A is applicable to the design and engineering or new buildings and other projects under the Army military construction programs, as well as in the installation, rehabilitation, and replacement of current installation telecommunications infrastructure.

3.16.3 Distribution

Distribution of electrical and communications systems through a building is generally accomplished through branched distribution. A central chase or trunk will run the length or height of the facility, then, horizontal distribution systems run from a central connection closet to the end user. This distribution may be overhead, underfoot, or in many instances it is a combination of the two (Fig. 1-3.10).

3.17 SALE AND OUTLEASE OF ARMY ASSETS

3.17.1 In an effort to offset some of the impacts of constrained resources, the Army has implemented initiatives that improve cost effectiveness and efficiency of installation operations. To the extent permitted by law, funds that become available as a result of these initiatives are retained by, or returned to, garrison commanders.

3.17.2 The Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA [FM&C]) has developed the "Sales and Outlease of Army Assets - Installation Guide" to assist garrison commanders in using the sales and outlease program. The guide provides an overview of major policies, procedures, and responsibilities pertaining to the following three major initiatives of the program:

- Sale of Real Property
- Outlease of Real Property
• Outlease of Personal Property

The guide provides hyperlinks to Army policy for Sale and Outlease governing regulations and legal and informational references.

3.18 ARMY STANDARDS

3.18.1 The cited Army Standards shall be met.

• AR 140-483, *Army Reserve Land and Facilities Management*

• AR 200-4, *Cultural Resources Management*

• AR 350-19, *The Army Sustainable Range Program*

• AR 420-70, *Buildings and Structures*

• UFC 1-300-05A, *Installation Support*

• UFC 3-301-05A, *Design: Seismic Evaluation and Rehabilitation for Buildings*

• UFC 3-310-03A, *Design: Seismic Design for Buildings*

• UFC 3-520-01, *Interior Electrical Systems*

• UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*

• UFC 4-022-01, *Security Engineering: Entry Control Facilities / Access Control Points*

• UFC 4-171-05, *Design: Guide for Army Reserve Facilities*

• NG Pam 415-12, *Army National Guard Facilities Allowances*

• Americans with Disabilities Act Accessibility Guidelines (ADAAG)

• Uniform Federal Accessibility Standards (UFAS)

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

• TM 5-807-10, Signage

• TM 5-809-10/Navy NAVFAC P-355/Air Force AFM 88-3, Chap 13, Seismic Design for Buildings

• TM 5-809-10-2/Navy NAVFAC P-355.2/Air Force AFM 88-3, Chap 13, Sec B, Seismic Design Guidelines for Upgrading Existing Buildings

• Standards of Seismic Safety for Existing Federally Owned and Leased Buildings

• Army Barracks Master Plan, Appendix I, Army Barracks Standards

• Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003

• Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing

• Army Lodging Standards


• Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHNC 1110-1-23 Manual

• Army Chapel Standard Definitive Design


• Army Standards for Company Operations Facilities (COFs)

• Army Standards for Child Development Center Construction (for school-age children) October 2004
3.19 REFERENCES

3.19.1 The following references are provided for guidance.

- AR 190-13, *The Army Physical Security Program*
- AR 200-1, *Environmental Protection and Enhancement*
- AR 200-2, *Environmental Effects of Army Actions*
- AR 200-4, *Cultural Resources Management*
- AR 210-20, *Master Planning for Army Installations*
- AR 405-45, *Real Property Inventory Management*
- AR 405-70, *Utilization of Real Property*
- UFC 1-200-01, *Design: General Building Requirements*
- UFC 1-300-05A, *Installation Support*
- UFC 3-130-07, *Arctic and Subarctic Construction - Buildings*
- UFC 3-120-02AN, *Design Guide: Interiors*
- UFC 3-400-01, *Design: Energy Conservation*
- UFC 3-510-01-ANF, *Design: Foreign Voltages and Frequencies Guide*
• UFC 3-600-01, *Design: Fire Protection Engineering for Facilities*

• UFC 4-510-01, *Design: Medical Military Facilities*

• UFGS 096800, *Carpet*

• UFGS 099000, *Paints and Coatings*

• ER 1110-345-122, *Engineering and Design, Interior Design*

• DA Pam 200-4, *Cultural Resources Management*

• Department of Defense (DoD) Interior Design Resources Website

• TI 800-01, *Design Criteria*

• TI 811-16, *Lighting Design*

• TM 5-683, *Electrical Interior Facilities*

• TC 25-8, *Training Ranges*

• Army Knowledge Online

• Army Brand Theme Operations Home Page

• Army Barracks Master Plan

• Air Force Sustainable Facilities Guide

• Air Force Interior Design Guides

• Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA [FM&C]) Sales and Outlease of Army Assets - Installation Guide

• Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website

• Air Force Sustainable Facility Guide

• *Engineering Knowledge On-line (EKO) Sustainable Design and Development*
• U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website

• Whole Building Design Guide

• Unified Facilities Guide Specifications (UFGS), "Division 12 - Furnishings", Construction Criteria Base

• Engineering and Construction Bulletins

• Construction Criteria Base

• Assistant Secretary of the Army memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003
CHAPTER 4
CIRCULATION DESIGN STANDARDS

4.1 Introduction

4.1.1 The image of the installation is greatly determined by the design and location of roadways, walkways, entrances, and parking lots. The primary roadway system and parking lots utilize considerable amounts of land and are a visually dominant element of any installation (Fig. 1-4.1). The location of primary circulation elements is presented in Chapter 2, Site Planning. This chapter provides standards and the details of circulation design.

4.1.2 Provide safe and efficient vehicular movement that results in better orientation and contributes to the development of a positive environment for installation personnel and visitors. The circulation system provides a primary vantage point from which all installations are viewed. Use the circulation component to assess the circulation elements of the installation and identify specific characteristics that provide visual zone and theme identity.

4.1.3 Roadways, pedestrian walkways, and bicycle trails will be designed to provide a hierarchy of circulation design and carrying capacity. Create a functional hierarchical network that separates incompatible types of traffic. Separate traffic to promote sustainability and provide more efficient energy consumption.

4.1.4 Reinforce the circulation hierarchy through design, planting, signage, and lighting to promote a more functional and attractive visual experience and a sense of orientation.
4.2 CIRCULATION STANDARDS

The standard for the circulation system on the installation is to establish a sustainable system that promotes function, aesthetic appeal, environmental preservation, and energy conservation while providing safe and efficient circulation. The standards below are to be followed to achieve a sustainable circulation system:

- Provide circulation that meets antiterrorism and security requirements and promotes and enhances public health and safety.
- Provide a system of circulation that includes all forms of vehicular and pedestrian circulation (Fig. 1-4.2).
- Provide a system that includes hierarchies of vehicular and pedestrian traffic flow (Fig. 1-4.3).
- Adapt the circulation system to the natural conditions of the site (Fig. 1-4.4).
- Improve the existing circulation network for expansion, safety, way finding and appearance.
- Promote maintenance and repair of existing and proposed circulation systems.

4.3 ROADWAY HIERARCHY STANDARDS

4.3.1 The roadway network of the installation will function and visually reflect a logical hierarchy of traffic circulation. The network will separate types of traffic by function and volume, ranging from through traffic to local traffic. The visual character of each segment of the network will appropriately convey its role and function within the overall network. The basic network is classified as follows in terms of the type, character, and appearance of the road (Fig. 1-4.5).

4.3.1.1 **Highway Standards.** Highways provide primary high-speed traffic access to, around, or through a military installation. The design standard includes:

4.3.1.1.1 Continuous, relatively straight or large radii curvilinear alignments that carry high-speed through-traffic between major activity centers within a region.

4.3.1.1.2 A minimum of two lanes in each direction typically divided by a median or median divider.

4.3.1.1.3 Alignments that border lane use areas rather than bisect them, and green space buffers between the road and adjacent uses.
4.3.1.1.4 Controlled access onto the road.

4.3.1.1.5 Either grade-separated or at grade channelized intersections with traffic signal controls.

4.3.1.1.6 Shoulders for emergency stopping but strict prohibition of on-street parking.

4.3.1.1.7 Street signing, lighting, and planting that reflects the high-speed nature of traffic movement.

4.3.1.2 **Primary Roadway Standards.** These are arterial routes that connect major activity centers, provide the primary access through the installation, and provide the means by which most people view the installation (Fig. 1-4.6). These roadways often traverse the entire installation and carry the heaviest volume of traffic that results in high speed and high visibility corridors. Direct access to this type of road is to be restricted to crossing at major intersections. Design primary roadways as boulevards in urban areas and as avenues in rural and suburban areas (Fig. 1-4.7). Design standards include:

4.3.1.2.1 Continuous, through-traffic alignments that are relatively straight or large-radii curvilinear to handle moderate to heavy traffic.

4.3.1.2.2 Provide alignments that form the boundary between different land uses. Avoid alignments that transect a land use zone.

4.3.1.2.3 Two or more moving lanes in each direction typically divided by a median.

4.3.1.2.4 Controlled access and a minimum of curb cuts limited to entranceways to major facilities or building groups.

4.3.1.2.5 At-grade intersections with signal controls.

4.3.1.2.6 On-street parking prohibited.

4.3.1.2.7 Medians, street lighting, signing, and planting that enforces the moderate- to-high speed nature and importance of the road.

4.3.1.2.8 Provide curbs, gutters, and sidewalks in all cantonment areas and other residential areas with densities greater than two dwelling units per acre.
4.3.1.3 **Secondary Roadway Standards.** Secondary roadways serve as connectors between primary roads and tertiary roads and typically connect primary roads to adjacent land use zones. Secondary roads accommodate moderate to slow traffic speeds with one moving lane in each direction (Fig. 1-4.8). On-street parking is prohibited and left-turn lanes provided at intersections with primary roads. Design standards include:

- **4.3.1.3.1** Continuous through-traffic alignment between primary roads, either straight or curvilinear, based upon the design speed, topography, and land pattern.

- **4.3.1.3.2** Direct access to abutting property.

- **4.3.1.3.3** A maximum of two moving traffic lanes in each direction, either undivided or a boulevard with planted median.

- **4.3.1.3.4** On-street parking is prohibited.

- **4.3.1.3.5** Street lighting, signing, and planting that reflect the moderate-to-slow speed nature of traffic and the character of the land use area they are in (Fig. 1-4.9).

- **4.3.1.3.6** Provide curbs, gutters, and sidewalks separated from the road by a planting strip in all cantonment area and other residential areas with densities greater than two dwelling units per acres.

4.3.1.4 **Tertiary Roadway Standards.** Tertiary roadways provide access to individual facilities, parking and service areas. They are designed to handle low speed, low volumes of traffic, with one lane in each direction (Fig. 1-4.10). Tertiary roadways make use of “T” intersections and cul-de-sacs to reduce through traffic, promote safety, and limit noise impacts from truck traffic. Design standards include:

- **4.3.1.4.1** Alignments designed to discourage through-traffic.

- **4.3.1.4.2** Alignments are relatively short straight or curvilinear keeping with topography, land use, and slow speed nature of traffic (Fig 1-4.11).

- **4.3.1.4.3** Generally a maximum of two moving traffic lanes, one in each direction.

- **4.3.1.4.4** On-street parking allowable on an infrequent overflow basis by the addition of a parallel parking lane or bay.
4.3.1.4.5 Provide curbs, gutters, and sidewalks in all cantonment areas and other residential areas with densities greater than two dwelling units per acres. Sidewalks could be limited to only one side, depending upon need.

4.3.1.4.6 Street lighting, signing, and planting in character with slow speed nature of traffic and the land use area within which the road is located.

4.3.1.5 Cul-de-sacs Standards. Cul-de-sacs are short dead-end tertiary streets located primarily in residential areas (Fig. 1-4.12). They connect at one end to a tertiary or secondary street and have a turnaround at the other end, providing direct access to an abutting property while preventing through traffic. Design standards include:

4.3.1.5.1 Short, straight, or curvilinear alignment to serve abutting property (Fig. 1-4.13).

4.3.1.5.2 A maximum of two traffic lanes, one in each direction.

4.3.1.5.3 A maximum length of 183 meters (600 feet) except in areas where terrain and low density justify a longer length.

4.3.1.5.4 Turnarounds must include a diameter to accommodate fire and garbage trucks turning radius.

4.3.1.5.5 Turnarounds can be either symmetrical or offset.

4.3.1.5.6 Turnarounds should have center planting islands to reduce the expanse of paved area.

4.3.1.5.7 Overflow parking can be provided on street in parking bays or within center of turnarounds.

4.3.1.5.8 Provide curbs, gutters, and sidewalks in all cantonment areas and other residential areas with densities greater than two dwelling units per acres. Sidewalks could be limited to only one side, depending upon need.

4.3.1.5.9 Street lighting, signing, and planting is in character with the slow speed nature of traffic and the land use area being served.

4.3.1.6 Tactical Vehicle Trail Standards provide alternative access for track vehicles and other vehicles used in combat readiness training. They are required standards for installations, with high use of track vehicles, to enhance the movement of the
vehicles and reduce traffic congestion on the other installation roadways. These trails provide one lane access for vehicles between motor pools and maneuver areas. There should be widened passage points provided at reasonable intervals in order for vehicles going in opposite directions to safely pass each other. Trails will be hard surfaced, within developed areas, of a thickness to withstand the weight of track vehicles. The hard surface will reduce dust pollution. These trails should be designed to provide as direct access as possible while minimizing crossings with primary, secondary, or tertiary roads. All crossings and turning radius with the other roadway systems will be paved with concrete, to support the weight of the vehicles, and clearly marked with signage.

4.4 ROADWAY SETBACK STANDARDS

Department of Defense Antiterrorism standards state that all inhabited buildings within a controlled perimeter will be set back a minimum of 10 meters (33 feet) from roadways and that troop billeting and primary gathering spaces shall be set back a minimum of 25 meters (82 feet) from roadways. For inhabited buildings not within a controlled perimeter the minimum setback distance is 25 meters (82 feet) and for primary gathering places and troop facilities the minimum distance is 45 meters (148 feet). See, _UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings, Table B-1_ (Fig. 1-4.14).

4.5 ROADWAY SYSTEM DESIGN STANDARDS

4.5.1 The location and design of new circulation system alignments as well as improvements to the existing system will be prepared to promote development sustainability. They will be designed to minimize impacts, relieve driver monotony, and provide a positive visual experience for the user, without compromising safety (Fig. 1-4.15). The following design standards will be applied to circulation system design.

4.5.2 Blend Circulation with Natural Landform. The horizontal and vertical alignment of roads, walkways, and bikeways will minimize landform disturbance and blend with the natural setting.

4.5.2.1 Minimize cut-and-fill by avoiding steep terrain and aligning roadway, walkway, or bicycle systems to cross slopes diagonally or parallel to the contours rather than perpendicular to the contours.
4.5.2.2 Mold, cut, and fill slopes to blend into the natural landform (Fig. 1-4.16).

4.5.2.3 Blend road drainage ditches, swales, or channels into the natural landform.

4.5.2.4 Use cluster development wherever possible to limit the lengths and required intersections of roadway and other circulation system elements and to preserve land. Meet antiterrorism requirements when developing cluster type facilities.

4.5.2.5 Minimize pedestrian, railroad, and bikeway crossings of highway, primary, and secondary roads.

4.5.2.6 Use natural topographic conditions to create grade separated pedestrian, railroad, and bikeway road crossings wherever possible especially on highways and primary roads.

4.5.3 **Circulation to Preserve Vegetation Standards.** Design roads, walkways, and bike paths to minimize disturbance to existing vegetation, encourage re-vegetation in disturbed areas, and reduce landscape disturbance (Fig. 1-4.17). Design standards include:

4.5.3.1 Align roads through open areas rather than forested areas.

4.5.3.2 Minimize cut-and-fill to reduce the limits of clearing.

4.5.3.3 Clear only for sight distances rather than uniform right-of-way clearing.

4.5.3.4 Use tree wells or retaining walls to preserve specimen trees or significant vegetation areas.

4.5.3.5 Provide optimum conditions for re-vegetation by following proper planting and maintenance techniques.

4.5.3.6 Restore vegetation to disturbed areas using naturalistic plantings of native plant material.

4.5.4 **Minimize Adverse Impacts on Adjacent Land Uses Standards**

4.5.4.1 **Air Pollution.** Locate roadway alignments to minimize the impact of traffic-emitted pollutants on adjacent development. Standards include:
4.5.4.1.1 Locate roads adjacent to land uses that are minimally affected by traffic-emitted air pollutants.

4.5.4.1.2 Reduce the impact of traffic-emitted pollutants on more sensitive land use areas by locating the roadways downwind and/or providing planted buffers.

4.5.4.2 **Noise Pollution.** Design and locate roadways to reduce the impact of traffic noise on adjacent development.

4.5.4.2.1 Roads will be physically separated from sensitive land uses including residential, medical, education, recreation, administration, religious, library, community, or childcare facilities.

4.5.4.2.2 Use noise abatement techniques such as berms, sound barrier walls, and plant material to reduce noise levels.

4.5.4.2.3 Reroute truck and tank traffic to roadways adjacent to less noise sensitive land uses. Tracked vehicle traffic will be routed to a system of tank trails that are totally separate from corridors used by wheeled traffic vehicles.

### 4.6 PAVEMENT MARKING STANDARDS

4.6.1 Pavement markings shall be as described in Part 3 of the *Manual of Uniform Traffic Control Devices (MUTCD)*, also see Chapter 6, Site Elements, paragraph 6.4.4.3.4 for traffic related signage.

4.6.2 **Concrete Curbs and Gutters**

4.6.2.1 Concrete curbs and gutters shall not be painted except as indicated in paragraph 4.6.2.2. Markings shall be restricted to the pavement surface and marking paint shall not be applied to concrete curb, gutter, or any portion thereof, including curb cuts for vehicle or wheelchair access.

4.6.2.2 In residential areas, street address numbers may be painted on curbs (see paragraph 6.4.4.1.5.2).

4.6.3 Markings intended to prohibit parking shall be applied to the pavement surface parallel to the curb and gutter in a continuous band for the entirety of the restricted length of pavement.

4.6.4 Where appropriate a boxed area shall be created with diagonal lines to establish a no parking zone in street conditions such as curb side parking, etc.
4.7 INTERSECTIONS STANDARDS

4.7.1 Intersections will be planned or improved to provide safe and efficient traffic flow for both pedestrian and vehicular traffic, and shall conform to the standards set forth in the MUTCD. The following design standards will be used (Fig. 1-4.18):

4.7.1.1 All roadways will intersect at right angles (90 degrees); existing 85-95 degrees are acceptable.

4.7.1.2 Avoid dangerous, complex intersections of more than two streets intersecting at one point or offset intersections.

4.7.1.3 Eliminate intersections that are in close proximity to one another. They will be no closer than 30 meters (100 feet).

4.7.1.4 Use T-intersections for tertiary road intersections with secondary or primary roads to reduce conflict and promote safety.

4.7.1.5 Provide turning lanes at all intersections along primary roads to eliminate interference with through traffic flow.

4.7.1.6 Minimize intersections along primary roads to reduce points of conflict and increase safety. Existing intersections with secondary and tertiary streets will be eliminated by the use of cul-de-sacs with traffic routed along parallel streets to primary and secondary streets.

4.7.1.7 Provide adequate sight distances to meet standard requirements at all intersections. The location from where the driver is waiting to cross or enter a traffic lane to a point 23 meters (75 feet) down the centerline to the right and the left forms the sight triangle.

4.7.1.8 Minimize pedestrian and bicycle intersections with primary streets.

4.7.1.9 Provide crosswalks at all intersections where necessary, marked with paint or vinyl strips or identified with a different paving surface.

4.7.1.10 Provide pedestrian access to persons with disabilities in accordance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS). In the event of a conflict the most stringent standards will be applied. Sidewalks will have accessible curb cuts.

Fig. 1-4.18 – Intersection Design
4.7.1.11 Create local service drives or access roads to parallel highways and primary roads to provide access to properties fronting the primary road avoiding a direct curb cut from the primary road to each individual property.

4.7.1.12 Intersections between railroad tracks and high-speed roads must be signaled, well marked, have a clear line of sight down the tracks, and have a smooth transition. All other road crossings must be well marked and have clear line of sight down the tracks.

4.8 ENTRANCE GATE (ACCESS CONTROL POINT [ACP]) STANDARDS

4.8.1 The location and design of the installation entrance gates is a primary component of the installation circulation system. Entrance gates must be designed to be functional, while providing security protection not only for the installation itself, but also for personnel and others waiting to be admitted to the installation. Gates should also be designed as a visual amenity to provide an aesthetically pleasing entrance to, and exit from, the installation. Installation fence shall not be chain link within 400 meters of the installation public entrances and the Access Control Points (ACP). See Chapter 7, Force Protection, paragraph 7.7 for information on the design standards for installation gates and paragraph 3.2.2.8.1, Access Control Points.

4.9 PARKING STANDARDS

4.9.1 The parking standards for any one location will vary depending on the needs of the facility/facilities it supports. Table 4.1 that follows shows the minimum number of spaces for non-organizational vehicles as listed in Architectural and Engineering Instructions. Additional spaces should be provided if a parking study verifies requirements. Provisions will be made for preferred parking for car pools or van pools.
Table 4.1 Minimum Parking Requirements

<table>
<thead>
<tr>
<th>FACILITY</th>
<th>NUMBER OF PARKING SPACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration, Headquarters and Office Buildings</td>
<td>60% of assigned personnel</td>
</tr>
<tr>
<td><strong>Bakeries</strong></td>
<td>38% of civilian employees, largest shift</td>
</tr>
<tr>
<td><strong>Bank and Credit Union</strong> (when not included in a community shopping center)</td>
<td>2% of authorized customers served</td>
</tr>
<tr>
<td><strong>Cafeteria, Civilian</strong> (when not included in a community shopping center)</td>
<td>15% of seating capacity</td>
</tr>
<tr>
<td><strong>Central Food Preparation Facilities</strong></td>
<td>38% of military and civilian food service operating personnel, largest shift</td>
</tr>
<tr>
<td><strong>Chapels</strong></td>
<td>30% of seating capacity</td>
</tr>
<tr>
<td><strong>Child Development Centers</strong></td>
<td>8% of children, 80% of staff</td>
</tr>
<tr>
<td><strong>Commissary Stores, Food Sales</strong> (when not included in a community shopping center)</td>
<td>2.5% of authorized customers served</td>
</tr>
<tr>
<td><strong>Community Shopping Center</strong> (including such elements as Main Exchange, Miscellaneous Shop, Restaurant, Commissary Stores, Food Sales, Bank, Theater, Post Office)</td>
<td>4% of authorized customers served</td>
</tr>
<tr>
<td><strong>Enlisted Personnel Dining Facilities</strong>, for: Basic and Recruit Training, Advanced Individual Training, Service Schools, Recruit Reception Stations Permanent Party, Garrison (including Army Table of Organization and Equipment [TOE] and Table of Distribution and Allowances [TAD] units) Support Units, Construction Battalions, Weapon Plants, Personnel Transfer and Overseas Processing Centers</td>
<td>38% of military and civilian food service operating personnel, largest shift, plus 8 percent of enlisted personnel (patron parking) to be served during a meal period</td>
</tr>
<tr>
<td><strong>Exchanges, Main</strong> (when not included in a community shopping center)</td>
<td>2.5% of authorized customers served</td>
</tr>
<tr>
<td><strong>Family Housing</strong></td>
<td>2 spaces per living unit</td>
</tr>
<tr>
<td><strong>Field House</strong> (combined with Football and Baseball Facilities)</td>
<td>1% of military strength served</td>
</tr>
<tr>
<td>FACILITY</td>
<td>NUMBER OF PARKING SPACES</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>Fire Station:</strong></td>
<td></td>
</tr>
<tr>
<td>One-Company</td>
<td>7 spaces</td>
</tr>
<tr>
<td>Two-Company</td>
<td>10 spaces</td>
</tr>
<tr>
<td><strong>Guard Houses, Military Police Stations</strong></td>
<td>30% of guard and staff strength</td>
</tr>
<tr>
<td><strong>Physical Fitness Center</strong> (if only one at an Army installation)</td>
<td>1% of military strength served</td>
</tr>
<tr>
<td><strong>Physical Fitness Center, Area</strong> (regimental)</td>
<td>10 spaces</td>
</tr>
<tr>
<td><strong>Laundries and Dry Cleaning Plants</strong></td>
<td>38% of civilian employees, largest shift</td>
</tr>
<tr>
<td><strong>Libraries</strong></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>1 space for each 500 SF (46.5m²) gross area of floor area</td>
</tr>
<tr>
<td>Branch</td>
<td>8 spaces</td>
</tr>
<tr>
<td><strong>Vehicle Maintenance Shops</strong></td>
<td>38% of civilian employees, largest shift</td>
</tr>
<tr>
<td><strong>Schools, Dependent</strong></td>
<td></td>
</tr>
<tr>
<td>Without Auditorium</td>
<td>2 spaces per classroom</td>
</tr>
<tr>
<td>With Auditorium</td>
<td>2 spaces per classroom plus 15% of auditorium seats</td>
</tr>
<tr>
<td><strong>Service Clubs</strong></td>
<td>2% of enlisted personnel or officer strength served</td>
</tr>
<tr>
<td><strong>Swimming Pools</strong></td>
<td>20% of design capacity of the swimming pool</td>
</tr>
<tr>
<td><strong>Temporary Lodging Facilities</strong></td>
<td>100% of bedrooms</td>
</tr>
<tr>
<td><strong>Theaters</strong> (when not included in a community shopping center)</td>
<td>25% of seating capacity</td>
</tr>
<tr>
<td><strong>Unaccompanied Enlisted Personnel Housing</strong></td>
<td>70% of design capacity</td>
</tr>
<tr>
<td><strong>Unaccompanied Officers Personnel Housing</strong></td>
<td>100% of living suites</td>
</tr>
<tr>
<td><strong>Warehouses</strong></td>
<td>1 space for each 500 SF (46.5m²) gross area of office area, plus 1 space for 4 persons assigned to storage activities</td>
</tr>
</tbody>
</table>
4.9.2 The following are standards for parking:

4.9.2.1 All parking lots will be accessible to persons with disabilities in accordance with the requirements of the UFAS, paragraph 4.1.1(5)(a). If parking spaces are provided for employees or visitors, or both, then accessible spaces shall be provided in conformance with the required minimum number of accessible spaces shown in Table 4.2.

4.9.2.2 Allocate 400 square feet of parking lot area per car for initial planning and programming. The total provides adequate minimum space for the parking spaces, access drives, and planting islands that make up a parking lot. This allocation is not withstanding tactical military vehicles.

4.9.2.3 Minimize parking space requirements of a facility by selecting a site that will allow the sharing of parking with related activities. Use LID strategy (See paragraph 2.3.2.2.4.).

4.9.2.4 Small parking lots are preferable to large lots because they enhance the visual environment by increasing the percent of landscaped area to paved area and allow more conformance to natural topography.

4.9.2.5 The monotony of large parking areas can be altered by the use of designs such as curvilinear parking or the introduction of large planting islands (Fig. 1-4.19).

4.9.2.6 Provide walkways and bikeways connecting to parking lots in order to encourage access by alternative means of transportation (See Paragraph 4.13.).

4.9.2.7 Parking areas should be designed and enhanced to provide a more pleasing impact and a more comfortable physical experience for the user. The following

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**Table 4.2 - Required Minimum Number of Accessible Parking Spaces**

<table>
<thead>
<tr>
<th>Total spaces in parking area</th>
<th>Required minimum number of accessible spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 25</td>
<td>1</td>
</tr>
<tr>
<td>26 to 50</td>
<td>2</td>
</tr>
<tr>
<td>51 to 75</td>
<td>3</td>
</tr>
<tr>
<td>76 to 100</td>
<td>4</td>
</tr>
<tr>
<td>101 to 150</td>
<td>5</td>
</tr>
<tr>
<td>151 to 200</td>
<td>6</td>
</tr>
<tr>
<td>201 to 300</td>
<td>7</td>
</tr>
<tr>
<td>301 to 400</td>
<td>8</td>
</tr>
<tr>
<td>401 to 500</td>
<td>9</td>
</tr>
<tr>
<td>501 to 1000</td>
<td>2% of total</td>
</tr>
<tr>
<td>1001 and up</td>
<td>20 plus 1 for each 100 over 1000</td>
</tr>
</tbody>
</table>

---

Fig. 1-4.19 - Provide Islands with Trees to Soften Visual Expanse
design techniques can be used to create more aesthetically pleasing, physically comfortable parking lots.

4.9.2.8 Locate parking lots between and behind buildings to reduce the visual impact from the circulation system. Locate parking lots on relatively level areas to avoid excessive cut-and-fill. Design parking lots to be efficient in the design and placement of access drives and parking spaces. All drives providing direct access to parking spaces should provide spaces on both sides of the drive.

4.9.2.9 Provide planting areas at the ends of all rows of parking spaces. Provide islands with trees within the main parking lot to soften the visual expanse of the parking lot and provide shade and/or wind breaks (Fig. 1-4.20). Use natural topography and existing trees to visually screen parking areas from adjacent facilities and other parking bays (Fig. 1-4.21).

4.9.2.10 Design parking lots to preserve significant existing trees. Provide a planting area around the tree that is large enough to allow water to the root system.

4.9.2.11 Avoid on street parking along primary and some secondary streets because it reduces the vehicular carrying capacity of the street, is visually unattractive, and is unsafe.

4.9.2.12 Pave parking lots with concrete, asphalt, or permeable pavement as well as other sustainable paving material.

4.9.2.13 Provide parking structures, both below grade and above grade, for greater parking capacity in densely developed areas where available land is scarce. Parking structures are expensive, but they provide a number of benefits including efficient land use, reduced visual impact and protection of vehicles from inclement weather (Fig. 1-4.22). If parking structures are built they shall be designed to meet antiterrorism requirements.

4.9.3 Parking Area Design Standards. A comprehensive parking area design standard, which includes siting, parking area types, geometry (parallel, perpendicular, angled), access, and maintenance consideration, is located at the following website: U.S. Air Force Landscape Design Guide, Section 14, Parking Areas.

4.9.4 Antiterrorism Setback Requirements. Parking lots within a controlled perimeter will be located a minimum of 10 meters (33 feet) from inhabited structures, and 25 meters (82 feet)
from troop billeting and primary gathering structures. Parking lots without a controlled perimeter will be located a minimum of 25 meters (82 feet) from inhabited structures, and 45 meters (148 feet) from troop billeting and primary gathering areas (UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings, Table B-1). Designated parking for family housing located within secured perimeters with access control is excluded from the 25-meter (82 feet) setback requirement.

4.10 SERVICE AREAS

Facilities that require pickups and deliveries will have a service area that allows for easy access to a loading dock exclusively for service vehicles. These areas will be designed to provide direct, easy access for vehicles and not conflict with road operations (Fig. 1-4.23). They will be screened from public view to reduce negative visual impacts. Service areas will meet all antiterrorism requirements.

4.11 DROP-OFF AREAS

Facilities that include a high percentage of persons arriving by vehicle must include a vehicle drop-off area. Included are buildings such as headquarters, child development centers, schools, dining facilities, and clubs. Antiterrorism standards state that the access drive must be clearly defined and marked and that their intended use is clear to prevent parking of vehicles in those areas and that drop-off lanes will not be located under any inhabited portion of a building (UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings, para B-1.4) It is recommended that physical barriers be used to define the area. These barriers will include curbing, planters, removable bollards, or other barriers together with signage to identify and restrict access. The driveway shall be configured so that vehicles can be restricted during times of high alert without unsightly make shift “Jersey Barriers”. Access to the driveway must be located outside the standoff area with the initial approach parallel to the building, or a barrier must be placed so to prevent direct vehicular movement toward the building (Fig. 1-4.24).

4.12 WALKWAYS AND PEDESTRIAN CIRCULATION

4.12.1 Provide walkway connections for pedestrians between buildings and ancillary facilities such as parking lots and other areas. Well designed and located pedestrian walkways will provide a desirable alternative to total dependence on motor driven vehicles (Fig. 1-4.25).
4.12.2 The goal is to encourage the use of walkways as an alternative means of circulation. Pedestrian walkways should be designed and located to provide a comfortable, enjoyable experience for the user. The use of walkways within the installation promotes development sustainability by conserving energy, reducing air pollution, and decreasing the land requirement for parking. Additionally, these walkways provide a means to increase physical fitness.

4.12.3 In order to achieve this goal the following standards must be met:

- Provide walkways that are designed at a pedestrian scale to be comfortable and pleasant.
- Provide safe and secure pedestrian facilities that are separate from vehicular and railroad traffic.
- Provide amenities for pedestrians.
- Provide accessibility to all users, including physically impaired or challenged persons. All street and driveway crossings shall be ramped, marked, and accessible to persons with disabilities in accordance with requirements of the UFAS (Fig. 1-4.26). See the following UFAS paragraphs for the respective standards: Curb Ramps, paragraph 4.7; Ramps, paragraph 4.8; Stairs, paragraph 4.9. See the Federal Highway Administration reference document “Accessible Sidewalks and Street Crossings – an informational guide”.
- Provide links to major attractions and generators of pedestrian traffic.
- Provide design consistency throughout the walkway and be well drained.

4.12.4 Walkway Network Hierarchy Standards. Sidewalks are classified to conform to the hierarchy roadway system - Primary walkways, secondary walkways, and tertiary walkways. Non-roadway oriented sidewalks should be sized and placed where people will use them rather than creating worn “shortcut” paths. Railroad track crossing should be avoided, but where necessary, they should be well marked and have good line of sight. Walkways through railroad track ballast should be maintained with small, well-drained rock.

4.12.4.1 Primary Walkway Standards
4.12.4.1.1 Provide primary walkways (Fig. 1-4.27) placed along both sides of primary roadways within the cantonment areas. These walkways are also used for high volume pedestrian routes to facilities and should be designed along axis lines relating to adjacent building entries, plazas, or streets. They will be paved with concrete, brick, or other sustainable pavers.

4.12.4.1.2 Primary walkways will be sized to accommodate anticipated pedestrian use. They are to have a minimum width of 1.8 meters (6 feet), and a maximum width should be 3-3.5 meters (10-12 feet) in high use areas.

4.12.4.2 Secondary Walkway Standards

4.12.4.2.1 Provide secondary walkways (Fig. 1-4.28) along one or both sides of secondary and tertiary streets. They are designed to carry moderate volumes of pedestrians between activity centers and housing areas. They are to provide access to building entrances, plaza areas, or streets. They will be paved with concrete, brick, or other sustainable pavers.

4.12.4.2.2 These walkways will be sized to accommodate anticipated pedestrian use, but not less than 1.2 meters (4 feet), and a maximum of 3-3.5 meters (10 - 12 feet) in high use areas.

4.12.4.3 Tertiary Walkway Standards. Tertiary walkways (Fig. 1-4.29) provide pedestrian walkways in recreational and scenic areas for casual walking and hiking. They will be paved with concrete or bituminous asphalt, sustainable pavers, or constructed with woodchips. The layout of these walkways will have a meandering and curvilinear alignment. Paved walkways must have a minimum width of 1.2 meters (4 feet) (see Fig. 1-4.30). Wood chip trails will have a minimum width of 1 meter (3 feet). Where paths are designated for use by bicyclists and pedestrians, these widths are to be increased an additional three feet for each bike lane. See paragraph 4.13, Bikeway Standards.

4.12.5 Running Trails

To be Published

4.12.6 Troop Running Trail Standards. Troop running trails will be provided for soldiers both in and out of formation. The width is to be between 4.5-5 meters (approximately 15 feet) to provide the width necessary for four soldiers abreast with a cadence caller. Primary, secondary, and tertiary walkways can be designed to provide this function.
4.12.7 **Troop Movement Path Standards.** In locations where troops need to move four (4) abreast; for example, troops marching in formation between classrooms, barracks/dinning hall facilities, a hard surface walkway of 4.5-5 meters (15 feet) width will be provided.

4.12.8 **Site Amenities at Walkway Standards**

4.12.8.1 Use site furnishings to reinforce the walkway system hierarchy. Provide directional and informational signage. Locate site furnishings, such as benches, tables, waste receptacles, drinking fountains, and signage in response to travel distance and traffic volume (Fig. 1-4.31).

4.12.8.2 Site furnishings will be placed at regular intervals along walkways, parallel to the walk and facing the flow of pedestrian traffic.

4.12.9 **Landscaping at Walkway Standards.** Use a combination of canopy and ornamental trees along sidewalks to provide shade, define the path, provide visual interest, and discourage the creation of “shortcuts”. Use evergreen buffer plantings to screen harsh winds and undesirable views. Discourage the use of flowering/fruit bearing trees and shrubs along walkways.

4.13 **BIKEWAY STANDARDS**

4.13.1 Provide a minimum of 6.44 kilometers (4 miles) of Class I or II bikeway on each installation. The use of bicycles as alternatives to the automobile has become more acceptable to installation personnel. This trend is encouraged as a method of reducing the automobile vehicle trips within the installation and reducing the need for greater carrying capacity. Also, cycling is a popular recreation activity that is enhanced by the availability of a safe and well planned system of bike trails.

4.13.2 A bikeway system should provide direct routes between primary traffic and destination within the installation. This network is to be continuous and minimize conflicts between bikes, pedestrians, and vehicles. Bikeways will be planned and designed according to the classifications that define the level of separation they maintain from roadways and walkways. Ideally, bikeways should be physically separated from both roadways and walkways.

4.13.3 Bikeways are designed following Chicago Bike Lane Manual, according to the following classifications:
4.13.3.1 **Class I Bikeway.** A Class I Bikeway is intended for the exclusive use of bicycles. While it may be parallel to a roadway, it is physically separated by distance or a vertical barrier (Fig. 1-4.32). Class I Bikeway standards include:

- A class I Bikeway provides the safest and most efficient means of bicycle travel and is the preferred option for bikeway development.
- Crossing of a Class I Bikeway by pedestrians, train, or automobile should be minimized.
- If a Class I Bikeway does not closely parallel a roadway, it will be designed to provide appropriate bikeway gradient and curvature.
- Class I Bikeways require the greatest amount of space and advance planning to reserve land and assure appropriate routing.
- Railroad crossings must be well marked, with proper operating signals and clear sighting down the tracks. Road crossing transitions should be smooth and well drained.

4.13.3.2 **Class II Bikeways.** A Class II Bikeway shares the right-of-way with a roadway or walkway. It is indicated by a bikeway pictograph on the pavement and a continuous stripe on the pavement or separated by a continuous or intermittent curb or other low barrier (Fig. 1-4.33). Class II Bikeway standards include:

- Because some separation is provided for bicycle travel, a Class II Bikeway provides some level of safety for the bicyclist and pedestrian.
- While crossing by pedestrians or automobiles are discouraged, they are not as controllable as they are on
a Class I Bikeway because the Class II Bikeway is adjacent to the walkway or roadway.

- Because Class II Bikeways are tied to the adjacent roadway or walkway, route selection is important to maintain appropriate bikeway gradient and curvature.
- Class II Bikeways generally require less space than Class I Bikeways because they follow the alignment of and share the right-of-way with a roadway or walkway.

4.13.3.3 **Class III Bikeways.** A Class III Bikeway shares the right-of-way with a roadway or walkway. It is not indicated by a continuous stripe on the pavement or separated by any type of barrier, but it is identified as a bikeway with signs (Fig. 1-4.34). Class III Bikeway standards include:

- Because no separation is provided, there is a higher potential for safety conflicts between automobiles and bicycles and between bicycles and pedestrians.
- Class III Bikeways provide continuity within the bikeway network and designate preferred shared routes to minimize potential conflicts. To maintain safety for bicyclist and pedestrians, Class III Bikeways will be developed only where automobile and pedestrian traffic is moderate to light.
- Because Class III Bikeways share the roadway or walkway, route selection is important to maintain appropriate bikeway gradients and curvature.
- Class III Bikeways require the least space because they share the pavement with a roadway or walkway.

4.13.4 **General Bikeway Standards**

4.13.4.1 Provide a designated right-of-way for bike traffic, separate from vehicular and pedestrian routes.

4.13.4.2 Locate bikeway crossings away from vehicular intersections with crossings marked on the street pavement.
4.13.4.3 When separate bicycle right-of-ways are not feasible, designate bikeway lanes with paint on the right-hand side of roadways.

4.13.4.4 Bikeways must never share undesignated space with roadways except at crossings.

4.13.5 **Bikeway Furnishing Standards.** Provide site furnishings such as bike racks, benches, tables, waste receptacles, drinking fountains, and signage along paths. Location of these amenities are to be in response to travel distance and traffic volume. Encourage use of the bicycle system by making trails visually attractive and providing pedestrian amenities in appropriate locations.

4.13.6 **Landscaping Standard.** Use a combination of canopy and ornamental trees along bicycle paths for shade, route definition, and visual interest. Provide evergreen buffers to screen harsh winds and undesirable views.

4.13.7 **Crosswalks.** Provide crosswalks at all intersections of roads and walkways/bikeways. When laying out the crosswalk, consider the following:

- Extend paving of crosswalks across the road in heavily used areas. Raised crosswalks eliminate the need for curb ramps in sidewalks.
- Provide a clear line of sight for motorist and pedestrians. Do not plant in sight lines. Walkways should meet the road at 90-degree angles (Fig 1-4.35).
- Adequate light will be provided.
- Provide barrier-free access at all intersections or used raised crosswalks.

4.13.8 **Walkway and Bikeway Lighting Design Standards.** Provide roadway lights and building exterior lights as walkway and bikeway lights. Maximum use will be made of multi-purpose lighting systems. Paragraph 10.4 of *UFC 3-550-03FA, Design: Electric Power Supply and Distribution* directs the following walkway and bikeway lighting standards.

4.13.8.1 **Light Intensities Standards.** Light intensity values are dependent upon whether walkways and bikeways are adjacent to roadways or are isolated from vehicular traffic.

4.13.8.1.1 **Walkways and Bikeways Adjacent to Roadways.** Walkways and bikeways will be illuminated to not less than one-
half the maintained illumination required for adjacent roadways. Areas having a change in grade, such as stairs and ramps, will require special treatment. Crosswalks in the middle of the block will be illuminated to 1.5 to 2 times the normal roadway lighting level.

4.13.8.1.2 **Walkways and Bikeways Remote from Roadways.** Walkways and bikeways remote from roadways will have a minimum of 5 lux (0.5 foot-candle) average illumination measured in lo-foot levels. Pedestrian tunnels will have 40 lux (4.0 foot-candles), stairways will have 6 lux (0.6 foot-candles), and overpasses will have 3 lux (0.3 foot-candles) illumination.

4.13.8.2 **Light Pole Design.** Where pole mounted lights illuminate only walkways or bikeways, shorter poles are most suitable, but luminaire height will not be less than 10 feet. Construction will be such as to minimize vandalism by use of break-resistant lenses, tamperproof screws, and sturdy poles.

4.13.9 **Bikeway Signs Standards.** The federal Manual of Uniform Traffic Control Devices (MUTCD) provides standards signs and markings for bicycle lanes and related bicycle facilities. See the [MUTCD, Part 9](#) and any applicable amendments for traffic controls for bicycle facilities standards.

### 4.14 ARMY STANDARDS

4.14.1 The cited Army Standards shall be met.

- **AR 420-72, Transportation Infrastructure and Dams**
- Manual For Railway Engineering
- **UFC 3-210-02, Design: POV Site Circulation and Parking**
- **UFC 3-250-18FA, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas**
- **UFC 3-250-01FA, Design: Pavement Design for Roads, Streets, Walks and Open Storage Areas**
- **UFC 3-260-02, Design: Pavement Design for Airfields**
- **UFC 3-550-03FA, Design: Electric Power Supply and Distribution**
• **UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings**

• **UFC 4-860-01FA, Design: Railroad Design and Rehabilitation**

• **Americans with Disabilities Act Accessibility Guidelines (ADAAG)**

• **Uniform Federal Accessibility Standards (UFAS)**

• **Manual of Uniform Traffic Control Devices (MUTCD)**

• **Chicago's Bike Lane Design Manual** (Provides a comprehensive series of technical drawings and design specifications for bike lanes).

### 4.15 REFERENCES

4.15.1 The following references are provided for guidance.

• **U.S. Air Force, Landscape Design Guide, Parking Area**

• **U.S. Air Force, Landscape Design Guide, Walkways and Bikeways** (Provides a comprehensive walkways and bikeways planning guide including sections on paving materials and gradients and curvature data).

• **Illumination Engineering Society of North America (IESNA)**

• Federal Highway Administration reference document “Accessible Sidewalks and Street Crossings – an informational guide”.

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CHAPTER 5
LANDSCAPE DESIGN STANDARDS

5.1 INTRODUCTION

5.1.1 The Landscape Design Standards includes the selection, placement, and maintenance of plant material on the installation. Landscape plantings provide a simple and cost effective enhancement to the general appearance of the installation.

5.1.2 The visual image conveyed by a military installation is defined not just by architectural character and site organization, but also by an attractive, organized landscape design (Fig. 1-5.1). The presence of plant material on the installation greatly enhances the visual character and environmental quality of the installation.

5.1.3 Plantings add an element of human scale to open spaces and can be used functionally to screen undesirable views, buffer winds, and reinforce the hierarchy of the circulation system. They provide a visual transition between dissimilar land uses and enhance Force Protection measures.

5.2 LANDSCAPE OBJECTIVES

5.2.1 Use plant material within the installation to improve the physical and psychological well being of the people who live and work on the installation. This is achieved through the following standards:

5.2.1.1 Preserve and enhance civic open spaces, focal points, and architectural features through the proper placement of planted trees, forest lands and fields, lawns, and detailed planting features such as shrubs, bedding plants, and groundcovers.
5.2.1.2 Improve the overall visual quality and sustainability of the installation through the use of native plant material (Fig. 1-5.2).

5.2.1.3 Blend built environment with natural environment.

5.2.1.4 Provide scale and comfort to pedestrian environments (Fig. 1-5.3).

5.2.1.5 Reinforce the hierarchy of the circulation system (Fig. 1-5.4).

5.2.1.6 Screen unsightly views or elements.

5.2.1.7 Buffer incompatible land uses.

5.2.1.8 Enhance Antiterrorism / Force Protection capabilities.

5.3 STANDARDS OF LANDSCAPE DEVELOPMENT

5.3.1 Base landscape design on the following standards: (Fig. 1-5.5).

5.3.1.1 **Unity.** Select and place plant material to blend, screen, and soften incompatible architectural or other unattractive visual impacts. Plant material as a unifying element in front of a building or view to frame and enhance the visual impact.

5.3.1.2 **Balance.** Plant material selected and placed to provide visual equilibrium or balance through the use of either a symmetrical or asymmetrical planting scheme. Symmetrical plantings are generally more formal while asymmetrical plantings are informal.

5.3.1.3 **Contrast.** Plant material selected and placed to provide differences in size and shape that add interest to the environment. Locate plants to provide a backdrop for other plants such as a hedge behind a bed of annuals or perennials.

5.3.1.4 **Rhythm.** Provide repetition of a single plant or a mass of plants for visual interest and formality to the landscape. Rhythm produces emphasis and unity and is especially effective in articulating main circulation routes.

5.3.1.5 **Color and Texture.** Select plants selected and placed to provide visual interest according to their color and texture. Colors are classified as either warm (red, orange, yellow) or cool (violet, blue, green). Texture is classified as either coarse or fine.
5.3.1.6 **Simplicity.** Use landscape plans that are broad and simple in form to limit excessive maintenance. Plant material grouped in beds with simple edges that are easy to mow. Small turf areas will be avoided because of the difficulty of mowing. Minimize the use of annuals because of the high maintenance involved.

5.3.1.7 **Ultimate Effect.** The landscape plan will be prepared with consideration for the mature size of all plants. The spacing of all material will be to nursery industrial standards for mature material to account for spread as well as height. The ultimate height of the material will also be considered in relation to windows and other visual concerns.

5.3.1.8 **Spatial Articulation.** Plants will be selected and placed to create enclosed spaces or to separate spaces from one another. They will also be used to direct people by visually defining and reinforcing patterns of movement. The degree of enclosure, separation, or movement is dependent upon the density, form, and type of plants used.

### 5.4 SUSTAINABLE LANDSCAPE DEVELOPMENT

5.4.1 Use plant material on the installation to promote the sustainability of the development. Trees, shrubs, groundcover, and vines provide aesthetic appeal as well as preservation of fauna and flora, energy conservation, climate modification, erosion control, air purification, and noise abatement (Fig. 1-5.6).

### 5.5 LANDSCAPE DESIGN STANDARDS

5.5.1 Proposed plantings will be reviewed to ensure that site conditions (soil, topography, adjacent uses, and architecture) and climatic criteria (sun, shade, and moisture requirements) are considered in the desired plant design and selection (i.e., form, texture, color, size). The uses and users of the site must also be considered. Landscape planting plans will be approved by qualified personnel to provide quality assurance and promote design consistency within each visual zone.

5.5.2 The following paragraphs present landscaping guidelines for the various locations of plant material use.

5.5.2.1 **Foundation Planting.** Provide foundation planting for a green background and additional plantings to add scale and character to the building. Integrate the building with its surroundings, screens HVAC and other utilities and create a sense
of arrival (Fig. 1-5.7). Develop foundation planting plans considering Antiterrorism / Force Protection measures (See paragraph 5.10.). Foundation planting may be as minimal as abutting lawn or ground cover, simple shrubbery or a massing of shrubbery fronted by bedding plants and edging. Consider the following:

5.5.2.1.1 Focal and seasonal plantings will be located at building entries for pedestrian interest.

5.5.2.1.2 Use the architecture of the building to evaluate the planting design and selection of plants.

5.5.2.1.3 Plant materials must not block windows and views from interior spaces.

5.5.2.1.4 Trees will be setback from the building walls to provide space for mature growth and to prevent root systems from damaging the foundation.

5.5.2.1.5 Use a symmetrical foundation planting design for a symmetrical building.

5.5.2.1.6 Do not plant flowering plants near entrances due to the possibility of insect problems (bee stings, etc.).

5.5.2.2 Screening Standards

5.5.2.2.1 Windscreens. Use a combination of evergreen and deciduous trees to provide windbreak protection from prevailing winds. Windbreak plantings should be irregular in form, rather than straight and evenly spaced, in order to provide more effective wind control and to visually blend with the natural character of the installation.

5.5.2.2.2 Screening of Dumpsters. Screening of dumpsters with landscape planting used to supplement wood fence and masonry wall dumpster enclosures (Fig. 1-5.8).

5.5.2.3 Buffer Planting Standard. Use a mixture of evergreen and deciduous trees and shrubs to visually separate land uses and to help separate visual zones.

5.5.2.4 Open Space Planting. Enhance open space areas with planting. Use a mix of evergreen, deciduous, and flowering trees. Plant the same kind of trees in massive groupings to impact the vast open areas.
5.5.2.5 **Street Tree Standards.** Street tree plantings will be used to reinforce vehicular hierarchy, orient and direct traffic, upgrade views, and to visually de-emphasize on-street parking (Fig. 1-5.9). Also, in the design of a street tree planting, separate plant species may be used to identify distinctive details or areas of the installation, for example, a particular land use relationship, historical district, community area, or other similar entity.

5.5.2.5.1 Use formal street trees in single rows to visually reinforce primary and secondary roads. Use regularly spaced and uniformly shaped deciduous trees to provide a regimented appearance.

5.5.2.5.2 Use informal groupings of street trees along tertiary routes. Utilize medium size deciduous trees to screen on-street parking along roadways. Set trees 1 to 2 meters (3 to 6 feet) from the back of curbs. Spacing will be uniform, except where curb cuts interrupt regular spacing.

5.5.2.5.3 Street trees will be deciduous species, resistant to salt and root pressure, and should have a 10' to 12' high clearance between the street pavement and branch height to allow adequate clearance for pedestrian and vehicle traffic to pass unimpeded by lower branches.

5.5.2.5.4 The street tree layout will coordinate with the layout of street lighting.

5.5.2.5.5 Appropriate plant heights are to be used within sight triangles to ensure safe views from intersections.

5.5.2.5.6 Coordinate planting with utilities and communication systems. Weeping trees will not be used in locations where they may hang over the roadway or block views.

5.5.2.6 **Parking Lot Planting Standards.** Parking lots are often the least attractive elements on a military installation. Use landscape plant material and earth berms to improve the appearance of these areas as well as help define circulation and reduce heat gain during summer months (Fig. 1-5.10).

5.5.2.6.1 Use shade tree plantings at parking lots to reduce glare and moderate ambient air temperatures on the lot. Optimum
Spacing of parking lot shade trees is 10 to 12 meters (35 to 40 feet) on center.

5.5.2.6.2 Choose trees and shrubs that require minimum maintenance and will not litter the parking area with leaves, fruit, or nuts.

5.5.2.6.3 Consider sight distances near entrances and exits when selecting and placing plant material.

5.5.2.6.4 Select trees, shrubs, and ground covers that can withstand harsher conditions, such as sun, glare, heat, and reduced water supply.

5.5.2.6.5 Use a mix of evergreen and deciduous plant material to screen parking areas from adjacent uses. Do not use plants that harm vehicle finishes.

5.5.2.7 Environmental Control Planting. When properly placed, plants can provide environmental benefits, as well as address visual concerns.

5.5.2.7.1 Use deciduous trees and shrubs at courtyards, buildings and along streets to provide shade, moderate temperatures and reduce glare during the summer months while allowing solar exposure in the winter.

5.5.2.7.2 Locate deciduous plantings on the southeast and southwest corner of buildings or courtyards to mitigate solar radiation and glare due to heat build-up and lower sun angles in the mid-morning and late afternoon hours.

5.5.2.7.3 Use mixed massings of deciduous shrubs and evergreen trees to provide sound control along primary and secondary roads.

5.5.2.8 Image Planting. The image of the installation is formed by the visual impressions that exist within the installation. The primary locations of highly visible images are the main gate, along primary circulation systems, and at areas of high concentrations of people. Features such as signs, statues, static displays, and other primary visual images can be improved by the use of trees, shrubs, and ground cover.

5.5.2.9 Entrances to the Installation. Place landscaping that will develop a strong visual image and provide visual interest during all four seasons at entrances and streetscapes into the
installation are areas. The landscaping will meet Force Protection requirements (UFC 4-022-01, paragraph 6-21) (Fig. 1-5.11).

5.5.2.9.1 The landscape materials and planting areas will be proportional in scale to the hierarchy of the street on which they are located.

5.5.2.9.2 Landscaping will be integrated with the Force Protection requirements of Chapter 7. Low shrubs, groundcover, annual/perennial plants and canopy trees provide seasonal interest as well as maintain views required to ensure force protection measures. Large evergreen trees are discouraged in these locations because they may obstruct sightlines and adversely impact the need for force protection. Adequate lines of sight must be maintained for guard personnel to observe vehicular and pedestrian traffic approaching the gate.

5.5.2.10 Xeriscape. Xeriscape will be used for conservation of water and energy through creative and adaptive landscape design. Xeriscape landscapes provide attractive solutions that save money, water, and maintenance. The following website provides guidance on specific design principles of the xeriscape design process and xeriscape design application:


5.6 PLANT MATERIAL SELECTION STANDARDS

5.6.1 Trees, shrubs, ground cover and turf are the major elements of a planting composition. Basic plant selection criteria should consider creating a unified composition utilizing native materials for low maintenance and sustainability, avoiding incompatible colors, textures and forms, and matching the appropriate plant to the land use, situation, and environmental condition.

5.6.2 The ability of plant material to provide lasting benefit is dependent upon the plant's hardiness and its appropriateness to the site use. Major factors affecting plant hardiness are soil type and organic content, temperature, moisture and light. These climatic conditions can be modified to an extent by specific site conditions, such as wind protection, solar orientation, and planting design, to create microclimates.

5.6.3 Selecting appropriate plants for a given condition is only one aspect of planting design. Compositional arrangement to provide texture variety and to accent site and building features is another. The selection and composition of a planting design
requires an understanding of each plant's characteristics, form, and environmental needs as well as how each plant can relate to and complement other plants in the design. Plants are used in four basic design categories:

- Canopy (Trees)
- Barrier (Shrubs and bushes)
- Screen (or Baffle) (Trees and shrubs forming wind breaks or blocking the view of dumpsters and utilities, etc.)
- Groundcover (grass, ivy, etc.)

5.7 PLANT MATERIAL INSTALLATION STANDARDS

5.7.1 A key step in assuring successful planting is to select plants of the highest quality. Plant material should be of the size, genus, species, and variety to comply with the recommendations and requirements of the "American Standard for Nursery Stock" ANSI Z60.1.

5.7.2 As part of the design process and prior to plant installation, review the installation's Master Plans, Basic Information Maps, or As Built Drawings for utility locations and verify with the Directorate of Public Works or equivalent.

5.7.3 The planting and establishment of trees, shrubs, ground covers, and vines is detailed in UFC 3-210-05FA, Design: Landscape Design and Planting Criteria, Chapter 3 (Fig. 1-5.12).

5.7.4 General Guidelines for Plant Installation.

5.7.4.1 At planting time, thin plants by removing one-third of the vegetative material.

5.7.4.2 Spray all evergreens with an anti-desiccant within 24 hours of planting.
5.7.4.3 Water all plants thoroughly during the first 24-hour period after planting.

5.7.4.4 Site all plants and stakes plumb.

5.7.4.5 Space plants according to their mature size (Fig. 1-5.13).

5.7.4.6 Install plant materials in groups for greater impact (Fig. 1-5.14).

5.7.4.7 **Installation of Lawn Areas.** Installation techniques for turf are detailed in *UFC 3-210-05FA, Design: Landscape Design and Planting Criteria*, Chapter 4. The details include site evaluation, site preparation, selection of turf, and maintenance requirements.

5.8 **MAINTENANCE OF PLANT MATERIAL**

5.8.1 The ease of maintenance is one of the primary goals when considering the success of any planting design.

5.8.2 **Pruning.** The pruning of trees and shrubs is done to maintain overall plant health, direct plant growth, maintain a desired shape, and increase flower or fruit development. In general, plant material should be allowed to conform to its natural shape. This practice allows the plant to mature in a healthy manner, and saves the time and energy required for trimming.

5.8.2.1 **Pruning Shrubs**

- Do not prune shrubs flat across the top.
- Prune branches yearly on thick-branched shrubs and at the base of the shrub.
- When pruning deciduous shrubs prune shrub stems as close to the ground as possible and shrub branches as close to the stem as possible.
- When "thinning out" deciduous shrubs prune about one-third of all branches where they meet their main stem.

5.8.2.2 **Pruning Trees**

- Remove a large limb by making three cuts as follows:
  - Make the first cut at the bottom of the branch 12-24" from the branch, attachment (Cut A, Fig 1-5.15).
  - Make the second cut on the top of the branch within 1" of the undercut (Cut B, Fig 1-5.15).
• Make the final cut just beyond the outer portion of the branch collar (Cut C, Fig 1-5.15). The first two cuts were necessary to remove the weight of the branch to allow cut #3 to be clean without ripping the bark.
• Never cut the central leader of the tree.
• Coniferous evergreens trees should be pruned, during the spring, by snipping off new growth. Avoid geometrically shaping plant material while pruning.

5.8.3 Mulching

• Use mulch around the base of plant material to provide for greater moisture and help inhibit the growth of weeds and grasses. Mulch is to be maintained at a depth of two (2) to four (4) inches.
• The best time to mulch for water conservation is in the late spring. Apply mulch immediately to new fall plantings.

5.8.4 Ground Cover Maintenance. Although ground covers do not require pruning, they may be periodically dug up in the spring or fall for propagation and to prevent overcrowding in their beds.

5.8.5 Landscape Maintenance Schedule. The general objective of a landscape maintenance schedule is to ensure an orderly and efficient care of the grounds. The landscape maintenance schedule identifies times throughout the year when specified maintenance should be undertaken. Use of the landscape maintenance schedule will improve all aspects of landscape on the installation. Materials and supplies can be ordered in a timely fashion, manpower needs can be calculated and anticipated, and a correlation between the level of maintenance and appropriate cost can be derived.

5.8.6 Irrigation. Essential to sustainable landscape development is maintaining a proper moisture level for plant nourishment and growth. Landscaping design will consider both the proper draining of planted areas as well as proper watering. Irrigation should always be considered an essential part of landscape maintenance and the system requirements integrated into any Planting Plan. See TM 5-630, Chapter 16 for detailed information regarding irrigation.

5.9 TREE PROTECTION AND PRESERVATION

5.9.1 Existing urban trees and forest should be preserved if they are in good health. Construction should be planned to provide for the preservation of significant trees.
5.9.2 During the clearing and construction process, trees will be protected from damage. Construction barricades should be erected to protect the existing trees to be preserved. The barricades will be no closer to the trunk of the tree than one-half the distance from the trunk to the drip line. Existing trees that cannot be preserved are to be considered for transplanting to a different location on site or to a different site.

5.9.3 Changes in the grade of the soil around trees can cause extensive root damage and eventually death of the tree. To prevent damage to the tree, it is important to maintain the existing grade for at least the size of the trees canopy (the drip line) (Fig. 1-5.16).

5.10 FORCE PROTECTION CONSIDERATIONS

5.10.1 The presence of vegetation on an installation can have both beneficial and detrimental impacts on security. The selection and placement of landscape plant material on Army installations is an integral element in the provision of protective measures to reduce the threat of terrorism.

5.10.2 Proper selection and placement of trees and shrubs can be utilized to provide visual screening without creating concealment for covert activity. The landscape architect responsible for tree placement should work closely with installation force protection experts to design a landscape plan that provides visual screening without compromising Force Protection measures (Fig. 1-5.17).

5.10.3 The plant material must allow building occupants to see out, but must not allow outside forces to monitor interior activity. The landscape architect should incorporate the following aspects into the design:

- Avoid conditions within 10 meters (33 feet) of inhabited structures that permit concealment of aggressors or obscure the view of objects or packages 150-millimeters (6 inches) in height from the view of security personnel. This results in the placement of shrubs and trees that are loose rather than dense in growth habit and possess multiple small stems rather than a single trunk that will obscure a 150 mm (6 inch) package.
- Vegetation groupings provide reduction of blast effect.
• Plant material selection and placement shall minimize potential hiding places for bombs and aggressors.
• Provide vegetation screens for play areas and outdoor recreation areas to obscure from off-installation view.
• Use trees to obscure sight lines of on-installation buildings from off-installation buildings (Fig. 1-5.18).
• Certain species, such as Hawthorne, Barberry, and Cacti are thorn in nature and can be as security barriers.

5.11 ARMY STANDARDS

5.11.1 The cited Army Standards shall be met.

- UFC 3-210-05FA, Design: Landscape Design and Planting Criteria
- UFC 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points
- TM 5-630, Natural Resources Land Management
- American Standard for Nursery Stock, ANSI Z60.1
- Overseas (Host Nation Standards)

5.12 REFERENCES

5.12.1 The following references are provided for guidance.

- USAF Landscape Design Guide
- C. Brickell and D. Joyce. Pruning and Training, 1996
6.1 INTRODUCTION

6.1.1 Site elements include all fixed amenities which are not an integral part of any facility but which provide utility and support the overall quality of life on the installation. (Fig. 1-6.1) These elements include the following four categories of utilitarian amenities:

- Site Furnishings
- Signs
- Lighting
- Utilities

6.1.2 Site elements contribute to the dominant visual impression within the installation. The specific site element features and equipment will, to the extent possible, reflect the local or regional design standards. This allows for ease of maintenance and blending into the local community. The four categories of site elements and their standards are discussed in detail in this chapter.

6.1.3 Outside the Continental United States (OCONUS), site elements for installations will reflect consideration of host nation design standards.

6.2 SITE ELEMENT STANDARDS

6.2.1 Planning for procuring, renovating, and/or installing site elements shall be based on visual and environment compatibility,
durability, functional suitability, and standardization for ease of maintenance. Site elements must meet the following standards:

6.2.1.1 Provide site elements that are appropriate to their intended function.

6.2.1.2 Establish a coordinated system of site elements that provide consistency and continuity throughout the installation to convey a sense of organization.

6.2.1.3 The design and location of the various site elements will express an image, character, and scale appropriate to the installation site.

6.2.1.4 Design and locate all site elements to meet AT/FP requirements.

6.2.1.5 Use recycled/salvaged materials wherever possible.

6.2.1.6 Minimize maintenance and repair through the use of efficient products that are vandal-proof and resistant to abuse.

6.2.1.7 Minimize negative visual impacts of all utility systems (Figs. 1-6.2 and 1-6.3).

6.2.1.8 Minimize environmental impacts of all utility systems.

**6.3 SITE FURNISHINGS STANDARDS**

6.3.1 Provide site furnishings to support the function of outdoor areas on installations. Outdoor furnishings are to be located in coordinated clusters to provide areas of multi-furnishing amenities, and avoid the haphazard proliferation of furniture elements around the installation. Furnishings shall be accessible to, and usable by, persons with disabilities, in accordance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS), with the most stringent standards to apply in the event of conflicts.

6.3.2 Site furnishings include the following:

- Seating
- Tables
- Telephone Booths
- Shelters
• Kiosks
• Walls and Fences
• Trash Receptacles
• Recycling Containers
• Dumpsters
• Flagpoles
• Movable Planters
• Bicycle Racks
• Tree Grates
• Bollards
• Play Equipment
• Mailboxes
• Monuments, Memorials, Military Equipment Static Displays
• Drinking Fountains

6.3.3 Seating. Seating includes benches and walls, as well as tables and movable chairs.

6.3.3.1 Benches

6.3.3.1.1 Bench Location. Benches will be located in areas of high pedestrian use, and arranged to encourage socialization within a pleasant outdoor setting. This includes pedestrian nodes along primary walkways, at major building entryways, courtyards, and at bus stops. Benches will be sited on concrete pads adjacent to walkways. Provide proper clearance around benches, a minimum 2’0” setback from adjacent sidewalks and a minimum of 5’0” between front of bench and any stationary obstacle. Provide appropriate planting treatment for visual definition and seasonal shade.

6.3.3.1.2 Bench Design

6.3.3.1.2.1 Wood Benches. Wood benches with backs are appropriate for the informal gathering, resting, eating and waiting uses characteristic of the community facility areas. Benches are to be a contoured style, constructed of redwood, textured pre-cast concrete, masonry, metal, or dark brown recycled plastic members. Standard bench size will be 6'-0" long. Metal support base should have a dark brown factory finish to match standard trim color. Bench dimensions must meet specifications presented in Unified Facilities Criteria (UFC) 2-600-01, Installation Design. Wall mounted benches will be similar in style and color to free standing benches.
6.3.3.2 Seating Walls

6.3.3.2.1 Seating Walls Location. Seating walls will be integrated into the overall area design and the pedestrian circulation system. Wherever possible, seating should be incorporated into planter boxes or retaining walls, particularly at building entrance areas.

6.3.3.2.2 Seating Wall Design. Seating walls should be between 18” and 22” high, and 12” to 18” wide and constructed of textured concrete or brick in a manner to complement or match the materials of the adjacent buildings (Fig. 1-6.4).

6.3.3.3 Tables. Locate tables together with seating that is oriented to the user needs of socializing, relaxing, or eating in less formal spaces with a pleasant setting and attractive view.

6.3.3.3.1 Table Location. Small groupings of tables in high visibility areas will be placed within proximity of recreation or food service facilities. These groupings are to be located on hard pavement areas adjacent to walkways. Pavement will be constructed of exposed aggregate or broom finish concrete. Incorporate tree plantings and overhead trellis structures within these areas to provide shade and spatial definition (Fig. 1-6.5).

6.3.3.3.2 Table Materials. Table materials are specific to each installation.

6.3.3.4 Chairs. Chairs are specific to each installation.

6.3.4 Telephones. Telephones will be incorporated into building architecture, utilizing building recesses and overhangs, or integrated into bus or other shelters. Provide a minimum 3’0” clearance between phones and the edge of walkways. All service line wiring will be underground or concealed. Phones will be equipped with lighting for nighttime use. Use standard wall-mounted phone without enclosures to meet AT/FP concerns.

6.3.5 Shelters. Provide shelters for those waiting for buses, and in areas where people congregate to socialize or eat such as in courtyards or picnic areas.

6.3.5.1 Bus Shelters

6.3.5.1.1 Bus Shelter Location. Bus shelters will be located at major facilities along the bus route such as Commissary/Post Exchange areas, barracks areas, Hospital, and Library. Bus stops
will relate to major pedestrian walkways, and be placed on concrete pads. Provide a minimum 3’0” clearance between shelters and the edge of walks.

6.3.5.1.2 **Bus Shelter Design.** Bus shelters will be designed to provide protection from wind, rain, and sun with a roof and enclosure on three sides. Side enclosures should be a transparent, unbreakable type material to allow for adequate visibility. Bus shelter design typically should be simple and consistent throughout any particular installation, matching the existing units in terms of materials, scale, and detail. Shelter design should have similar character as that for kiosks and vending machine shelters. Bus shelters should have a minimum size of 5' by 8' with a minimum height of 6'-6" from floor to underside of roof. The shelters are to include an integral bench, trash receptacle, and ashtray (Fig. 1-6.6).

**Fig. 1-6.6 - Bus Shelter Enclosures will allow For Adequate Visibility**

6.3.5.2 **Picnic Shelters**

6.3.5.2.1 **Picnic Shelter Location.** Picnic shelters will be strategically located and sized for shared use to discourage the proliferation of small shelters scattered throughout the installation.

6.3.5.2.2 **Picnic Shelter Design.** Picnic shelters can be open on all sides. The minimum size will be 20 feet square with a minimum 8-foot vertical clearance.

6.3.6 **Kiosks**

6.3.6.1 **Kiosks Location.** Provide kiosks where they are needed, on a concrete base, adjacent to walkways. Kiosks can be used as information centers at pedestrian nodes within the cantonment center. Allow a minimum of 3’ clearance on all sides.

6.3.6.2 **Kiosks Design.** Kiosk design should blend compatibly with other site furnishings and with the architectural character of the zone in terms of form, scale, and materials. A similar design treatment should be established for kiosks and shelters.

6.3.7 **Walls and Fences**

6.3.7.1 **Location and Use.** Walls and fencing will be used to provide visual screening, define pedestrian plaza areas, wind screening, pedestrian and vehicular control, security, and to retain soil (Fig. 1-6.7). The design of walls and fences should fulfill their function in harmony with the character and appearance of their setting.

**Fig. 1-6.7 – Use Screen Walls to Hide Mechanical Equipment**
6.3.7.2 **Walls.** Low walls will be used to define pedestrian court areas and provide informal seating. Screening walls are to be used where appropriate to screen building service areas. Walls adjacent to walkways must be free of any projections, such as signs or drain pipes that would pose a hazard to passing pedestrians. Construction of walls will incorporate either brick to match adjacent buildings, with stone or concrete cap, or concrete with a textured finish and stone or concrete cap. Retaining walls may be constructed of brick, native stone, versa-lock modular stone, concrete block with a stucco finish, treated wood, or concrete block planters (Fig. 1-6.8). See Appendix L. Walls used to screen service areas or trash enclosures should incorporate landscape plantings to help reduce the negative visual impact of these areas.

6.3.7.3 **Fences.** Fences or walls will be used for screening of service areas and site utilities, particularly dumpsters. Screen fencing is to consist of square tubular metal posts and rails with vertical wood or vinyl fence boards. Security fencing shall be designed following state department standards to match the threat risk. All fence posts will be securely anchored with concrete footings. All metal posts and framework will have a dark brown finish. Wood fencing should be western cedar. Hardware shall be stainless steel to prevent rust.

6.3.7.3.1 Chain link fences will be screened with trees and shrubs in the cantonment area. The use of chain link fence will be held to a minimum in the cantonment area. Installation fence shall not be chain link within 400 meters of the installation public entrances and the access control points (ACP). Refer to AR 420-70.

6.3.7.3.2 Fences for outdoor swimming pools will comply with the requirements of this section and other applicable Army safety references. Swimming pools are any structure intended for swimming, recreational bathing or wading that contains water over 24 inches (610mm) deep. This includes in-ground, above-ground and on-ground pools; hot tubs; spas and fixed-in-place wading pools. Swimming pools will be completely enclosed by a fence at least 4 feet (1290 mm) in height or a screen enclosure. Openings in the fence will not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or screen enclosure will be equipped with self-closing and self-latching gates.

6.3.8 **Trash and Recycling Receptacle Standards**

6.3.8.1 **Trash and Recycling Receptacle Location.** Trash containers must be visible and accessible for effective litter control. Containers are to be located conveniently along walkways,
near major pedestrian intersections, near building entrances and near seating and eating areas. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas (UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings, Table B-1).

6.3.8.2 Trash and Recycling Receptacle Design and Type. Containers should be of a design compatible and in harmony with other site furnishings. Receptacles should be of a type that are durable and facilitate multi-area usage (Fig. 1-6.9).

6.3.8.3 Dumpsters for Trash and Recycling

6.3.8.3.1 Dumpster Location. The location of dumpsters, for both trash and recycling, can have a significant visual impact and must be addressed as part of an overall building design and incorporated in site planning. Incorporate placement into areas screened with walls, fencing, or plant material (Fig. 1-6.10). Avoid locating dumpsters along major circulation or use areas. Dumpsters are to be directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas (UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings, Table B-1).

6.3.8.3.2 Dumpster Site Design. Incorporate plantings to buffer the visual impact of screen walls. Walls or fencing must be a maximum 6’ in height. Provide a minimum 3’ clearance on each side between screen walls and dumpsters to allow adequate pedestrian and truck access. All dumpsters are to be placed on concrete pads with aprons large enough to encompass the bearing points of the service vehicle.
6.3.9 **Flagpoles.** The standard flagpole for installations will be tapered mill finish aluminum, fitted with a gold anodized finish “ball” finial (Figure 1-6.11). The mounting detail is to be simple with a concrete base flush at grade. A concrete or sustainable paver pad must be used when poles are located in lawn areas. In plaza areas, flagpole locations and mounting detail will be integrated into the paving pattern. Flagpoles are to include lighting and may be accented with planting beds around the base of the flagpole.

6.3.10 **Planters.** Movable pre-cast concrete planters may be used outside building entrances to provide seasonal color and interest and function as security threat barriers (Fig. 1-6.12). Planters are to be located so they block uninterrupted vehicular access to a building, but not so they excessively impede pedestrian movement. Several planters of various sizes should be grouped together to produce an aesthetically pleasing display.

6.3.11 **Bicycle Racks and Storage**

6.3.11.1 Bicycle storage racks will be provided in areas that can be visually supervised and in close proximity to building entrances, high activity areas, major workplaces, and recreational facilities. (Fig. 1-6.13). Bicycle racks will be located on a concrete surface, as close to building entrances as possible, but where they will not impede pedestrian movement or block building entrances. The standard is a ribbon type tubular aluminum bike rack with an anodized dark bronze finish (Fig. 1-6.14).

6.3.12 **Tree Grates.** Tree grates will be used when installing trees in large paved areas such as pedestrian plazas, walks, and ceremonial entrance courts. Tree grates and planting pits will be a minimum of 5’x 5’.

6.3.13 **Bollards.** Bollards will be utilized to separate vehicular and pedestrian traffic, to direct access, AF/FP barriers, or as decorative elements, in pedestrian areas (Fig. 1-6.15). Avoid use of “Jersey Barriers” for permanent or long term application, using removable bollards instead, which can be configured to adapt to the requirements of different threat levels.

6.3.14 **Playgrounds/Tot Lots**

6.3.14.1 The playgrounds and tot lots on installations will use equipment that is consistent throughout the installation and that meets specific criteria of materials, color, and design.
6.3.14.2 **Playground Planning and Design.** Planning and design of unsupervised outdoor play areas that meet child safety and child development requirements as specified in *UFC 3-210-04, Design: Children's Outdoor Play Areas*. The guidance given in this publication meets the needs of children with and without disabilities.

6.3.14.3 **Playground Inspection and Maintenance.** Establish a play area inspection and maintenance program for Child Development Centers as specified in *TM 5-663*.

6.3.14.4 **Recalled and Banned Playground Equipment.** For updates on banned or recalled playground equipment consult the [Consumer Product Safety Commission Press Releases and Recalls](https://www.cpsc.gov) web site.

6.3.15 **Mailboxes**

6.3.15.1 Mailboxes will be located in close proximity to the facility they serve. When locating mailboxes consider the potential for the site element being used as a container for the concealment of explosives, etc. Consider Antiterrorism/force protection requirements for locating similar container types i.e. trash receptacles which are located a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) form billeting and primary gathering areas (*UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings*, Table B-1).

6.3.15.2 The location will be coordinated with the Postal Services.

6.3.15.3 If group mailboxes are required, provide central locations for them adjacent to hard-surface walkways but not to impede pedestrian movement.

6.3.16 **Monuments, Memorials, and Military Equipment Static Displays**

6.3.16.1 Monuments and static displays will be designed and placed in prominent locations to serve as visual focal points within the installation. Static displays of equipment will be consolidated in central locations to create a central museum or exhibition facility within the installation.

6.3.16.2 Memorials, naming of buildings, streets, and roads will conform to the guidance set forth in *AR 1-33*. 
6.3.17 **Drinking Fountains.** Outdoor drinking fountains should not be provided, except to support larger playgrounds, outdoor recreation facility complexes, and heavy use walkways, bike paths, and recreation areas if convenient to a potable water supply line. Steps should be provided for children and the *Americans with Disabilities Act Accessibility Guidelines (ADAAG)* and *Uniform Federal Accessibility Standards (UFAS)* standards met.

### 6.4 EXTERIOR SIGN STANDARDS

6.4.1 Provide standardized signage systems to facilitate movement, provide a sense of orientation, and reinforce standards of excellence and visually communicate information. Signs are highly visible features that must be attractive and compatible with their surroundings. Careful consideration must be given to what a sign says, how it is said, its visual appearance and organization, its location, structural support system, and relation to other signs within the installation. Signage creates a unifying element throughout the installation that visually ties the installation themes together and builds a reference and continuity that translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type, and sizing are found in *TM 5-807-10* (See Chapter 4, paragraph 4.6 Pavement Marking Standards.).

6.4.2 **Sign System Standards.** Basic design standards convey necessary information clearly, attractively, and are an integral part of any successful signage system. Follow the standards below:

6.4.2.1 **Simplicity.** Provide only needed information, avoid redundancy, and eliminate over-signing with resultant clutter and visual confusion. Sign messages must be clear, simple, and easy for individuals to process quickly.

6.4.2.2 **Continuity.** The system will be applied uniformly and consistently throughout the entire installation. The importance of consistent implementation extends from the larger issues of sign type and size down to accurate color continuity and matching typestyles.

6.4.2.3 **Visibility.** Signs will be located at significant decision points and oriented to provide clear sight lines for the intended user. Coordinate locations with respect to landscaping, utilities, adjacent signage, and various other street design elements to ensure long-term maximum visibility.
6.4.2.4 Legibility. Sign typestyle, line spacing, color, and size all combine to create the crucial design characteristics of legibility. Sign design will take into consideration users such as motorist, pedestrians, or bicyclists and the relative travel speed at which each type of user will be traveling when viewing the signs.

6.4.3 Vocabulary-Communications

6.4.3.1 A common language has been created for establishing a signing system. The different components that create the sign package have been named and referred to within the total signing system (Fig 1-6.16).

- Reference
- Information/Message
- Presentation
- Architectural Influence
- Graphic Architecture

6.4.4 Types of Signs

6.4.4.1 Information / Identification Sign Standards. These are signs that identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components (Fig. 1-6.17). They identify a location, and greet the visitor to that location. They will be compatible in scale and character with the architecture and also blend with the natural surroundings. These sign standards are:

6.4.4.1.1 Typeface: Lettering is self-adhesive backing material.

- Building Title: Helvetica Medium, Upper and lower case
- Building Numbers: Helvetica regular
- Building Addresses: Helvetica Medium, Upper and lower case

6.4.4.1.2 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss
6.4.4.1.3 **Materials:**

- Panel: Double-face 1/8” thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

6.4.4.1.4 **Building Identification Sign Standards**

6.4.4.1.4.1 Street Addresses. The addressing procedures prescribed in **DoD 4525.8-M, DoD Official Mail Manual** are mandatory for use by all DoD components. DoD 4525.8-M, Chapter 3 of the manual prescribes the following:

- All DoD address shall be assigned so they are compatible with the United States Postal Services automated delivery point sequencing (C3.3).
- The DoD installation is responsible for assigning city-style, street address on the installation (C3.3.2.2).
- Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee (C3.3.2.2.1).
- Only geographically locatable civilian-style street addresses such as 4102 Cindy Avenue shall be used (C3.3.2.2.4).
- Installations shall not use one street address for the entire installation and then use secondary unit designators such as "Building 123" to designate the delivery addresses on the installation (C3.3.2.2.5).
- Addresses such as "Building 123 Roberts Street" are not a valid address format and shall not be used (C3.3.2.2.6).

6.4.4.1.4.2 **Address Placement.** Buildings without identification signs will have the address number and street name centered above the main entrance or located to the right side (Fig. 1-6.18) (C3.3.2.3.1).

- Place both the street name and address number on the building to be visible from the street.
- Building facility number will not be visible from the street.
- Building identification signs will use street addresses (Fig. 1-6.19).
6.4.4.1.5 **Housing Area Address Standards**

6.4.4.1.5.1 The sign should be complimentary to the architectural setting of the housing area and approved by the installation Real Property Planning Board.

6.4.4.1.5.2 Housing numbers should be placed on the curb in front of the respective house and on the house where lighting will effectively light the numbering.

6.4.4.1.6 **Installation Identification Sign Standards**

6.4.4.1.6.1 Installation identification signs name the installation and display the official US Army plaque (Fig. 1-6.20). The designation "United States Army" must appear at the top of the sign in accordance with AR 420-70, paragraph 2-7h. Every installation entrance shall have an installation identification sign displaying only the US Army plaque, with the words "United States Army, Fort (Name of Fort), and gate name as indicated in "Figure 1-6.20 Installation Entrance Signs". The placement of Senior Mission Commander logo, unit crest, and other installation identification signs, monuments, or displays shall be located inside the installation beyond the cleared area of the Access Control Point of entry. When used service-wide, these signs convey a uniform image of strength and stability to the public. Emblems, branch colors, unit mottos, names, and titles of individuals are not to be displayed.

6.4.4.1.6.2 Installation identification signs consist of three types:

- Sign type A1, main entrance sign, identifies the principal visitor entrance.
- Sign type A2, secondary entrance sign, identifies entry points with relatively high volumes of visitor traffic.
- Sign type A3, limited access entry gate signs, identifies entry points with limited public access.

6.4.4.1.6.3 See TM 5-807-10, paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

6.4.4.1.7 **Street Sign Standards.** Street name identification signs should be designed with the same white on brown panel lettering, and materials as other information signs (Fig. 1-6.21).

6.4.4.2 **Directional Signs.** Place directional signs in central locations and at major decision points along circulation routes. These signs guide the motorist or pedestrian in, around, and out of
the installation (Fig. 1-6.22). The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. Messages will be grouped in the following order according to their arrow direction: forward, left, and right. In addition, placement of the message on the sign panel is determined by the arrow direction. Destinations forward and left are listed first and have flush left messages. Destinations right are listed next and have flush right messages. The arrow is centered in the space between the message and the edge of the sign. Prioritize destinations to be listed by giving the highest priority to the destinations that are most often sought by people new to the garrison or that serve as highly visible landmarks on the garrison. Those who live or work on the garrison or who visit frequently do not need the degree of help required by a first time or infrequent visitor. These standards are:

6.4.4.2.1 **Typeface:** Lettering is self-adhesive backing material.
- Helvetica Medium upper and lower case

6.4.4.2.2 **Arrow:**
- Place at end indicating direction (Fig 1-6.23).
- Stoke width: Helvetica Medium cap

6.4.4.2.3 **Color:**
- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

6.4.4.2.4 **Materials:**
- Panel: Double-face 1/8” thick aluminum
- Post: Aluminum or galvanized steel pipe or tube section, solid pressure treated wood, or recycled plastic.
- Foundation: Concrete pier or direct burial

6.4.4.3 **Regulatory Sign Standards.** These signs provide the rules for travel and parking on the installation. They include warning signs, parking control signs, etc. (Fig. 1-6.24). Related to these signs are pavement markings and traffic signals. These sign standards are:

6.4.4.3.1 **Typeface:** Lettering is self-adhesive backing material.
• Helvetica Medium upper and lower case

6.4.4.3.2 **Color:**

• Panel: Dark Brown
• Lettering: White
• Post: Dark Brown
• Exposed panel backs and edges: Dark Brown
• All paint: Semi gloss

6.4.4.3.3 **Materials:**

• Panel: Double-face 1/8” thick aluminum
• Post: Aluminum or galvanized steel pipe or tube section, solid pressure treated wood, or recycled plastic.
• Foundation: Concrete pier or direct burial

6.4.4.3.4 **Traffic Control Sign Standards**

6.4.4.3.4.1 **CONUS Installations.** National highway standards will be used for signs to regulate vehicular traffic on CONUS installation per AR 420-72, paragraph 2-15f. These standards are described in the *Manual of Uniform Traffic Control Devices (MUTCD)*. Also see MTMC Pamphlet 55-14, *Traffic Engineering for Better Signs and Markings*. This pamphlet clarifies existing standards and provides definite guidelines for installation officials to conform to the MUTCD. These standards shall be used installation wide to include installation Access Control Points. Exposed panel backs and edges will be dark brown.

6.4.4.3.4.2 **OCONUS Installations.** OCONUS installation streets and roads are to be considered extensions of the road system of the host nation and shall use traffic control device standards and criteria of the host nation per AR 420-72, Paragraph 2-15e. Exposed panel backs and edges will be dark brown.

6.4.4.3.5 **Prohibitory (Warning) Signs.** This category of signage is intended to maintain security and safety on the installation perimeter and at other specific secure areas. These signs notify visitors of restrictions, as well as other security procedures. The guidelines for design, fabrication, and placement of warning signs are found in *TM 5-807-10*, paragraph 3-9.

6.4.5 **Electronic Exterior Sign Standards.** All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited. Wheeled electrical signs will have an attractive presentation. Temporary landscape
elements should be used whenever possible. The siting of this type of sign will be approved by the RPPB. No sign of this type will be left in place for longer than six (6) months. After which time, the sign will be removed or turned into a permanent sign.

6.4.6 **Sign Placement.** Placement of signs differs according to the type of sign and the specific site constraints. The following guidelines apply to placement of the majority of signs.

6.4.6.1 Do not place more than one sign at any location. Traffic signs are the exception to this rule (Fig. 1-6.25).

6.4.6.2 Place signs in areas free of visual clutter and landscape materials.

6.4.6.3 Place signs in locations that allow enough time for the user to read and react to the message.

6.4.6.4 Signs will not be placed to block sight lines at intersections.

6.4.6.5 Place signs approximately 1.2 meters (4 feet) above ground level to be within 10 degrees the driver’s line of vision (Fig 1-6.26). Provide proper placement to avoid a hazard to children.

6.4.7 **Sign System Typography Standards**

6.4.7.1 **Military Emblems.** The Army has a rich tradition of military heraldry. Military emblems are an important part of the soldiers' identity and the emblems have been carefully crafted over the years to express unit pride and unique history and function of the unit. The care and use of organizational emblems in a signage system can add visual interest as well as build pride and a sense of history. However, the overuse of miscellaneous emblems can lead to clutter and a dilution of their importance. Colors for military emblems must be in accordance with the Institute of Heraldry.

6.4.7.2 **Department of the Army Plaque.** The plaque should be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be in accordance with AR 840-1 and must be reproduced in full color.

6.4.7.3 **Insignias.** The use of branch insignia, shoulder sleeve insignia, coat of arms and/or distinctive insignia on headquarters
signs is permitted. All military emblems must appear in full color. Motivational symbols or motifs will not be used.

6.4.8 **Visual Clutter Standards.** Reduce over-signing that detracts from a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

6.4.8.1 Eliminate clutter that creates confusion and ineffectiveness (Fig. 1-6.25). Often motorist and pedestrians are confused by the bombardment of messages that have no relationship to each other, or the communication is on such a minimal level that the sign serves no purpose.

6.4.9 **Location Map Standards**

6.4.9.1 Provide a location map as an integral element of an installation entrance. The installation entrance map along with others located strategically throughout the installation give a sense of place to the viewer (Fig. 1-6.27). The design and construction is to be of compatible architectural materials found throughout the installation.

6.4.9.2 The location map standards are:

- Plexiglas covered map for protection or weather resistant map
- Architectural compatible materials used for the base
- Paved walk-up area
- Litter receptacle
- Adjacent parking
- Current takeaway maps
- Lighting for night use

6.5 **EXTERIOR LIGHTING STANDARDS**

6.5.1 Provide lighting to meet functional requirement of installations. The Installation Lighting System conveys a sense of order and organization. The reference **TI 811-16** provides background information. Use the Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: **Lighting for Exterior Environments (RP 33-99)** to assist in selecting an exterior lighting system that will reduce light pollution. This will enable projects to obtain SPIRiT (or LEED) credits for light pollution reduction. There are five primary types of street element lighting on military installations. They are:

- Roadway Lighting
• Pedestrian Lighting
• Parking Lot Lighting
• Outdoor Architectural Lighting
• Security Lighting

6.5.2 The primary visual problem that exists with exterior lighting on most military installations has been the lack of overall coordination of a lighting system.

6.5.3 Provide the proper type of lighting system for different lighting requirements and locations. A system is composed of six primary components – fixtures, light height, type of pole, light spacing, type of lamp, and level of intensity of lamp. The proper type of lighting for various locations is shown in Table 6-1, Light Design Standard Matrix. All lighting will be located or designed to prevent light pollution or an undesirable spillover of light into other areas. Spotlights in particular should be aimed or screened to prevent glare in sleeping areas or that could blind motorists or pedestrians. For Lighting levels at Access Control Points, see Appendix B of the Standard Definitive Design for Access Control Points.
Table 6.1 Light Design Standard Matrix

<table>
<thead>
<tr>
<th>LIGHT DESIGN MATRIX</th>
<th>TYPICAL AREAS OF USE</th>
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</thead>
<tbody>
<tr>
<td>Access Control Points</td>
<td>Primary Roadways</td>
</tr>
<tr>
<td>Incandescent</td>
<td></td>
</tr>
<tr>
<td>Halogen</td>
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<tr>
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<tr>
<td>40' Max</td>
<td></td>
</tr>
<tr>
<td>25' Max</td>
<td></td>
</tr>
<tr>
<td>15' Max</td>
<td></td>
</tr>
<tr>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Cutoff</td>
<td></td>
</tr>
<tr>
<td>Utility</td>
<td></td>
</tr>
<tr>
<td>Bollard</td>
<td></td>
</tr>
<tr>
<td>Spot</td>
<td></td>
</tr>
<tr>
<td>Wall Mount</td>
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</tr>
<tr>
<td>Metal</td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td></td>
</tr>
<tr>
<td>120' Max</td>
<td></td>
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<td>90' Max</td>
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<td>Varies</td>
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</tr>
</tbody>
</table>

NOTE: For lighting levels at Access Control Points, see Draft Army Access Control Points Standard.
6.5.4 **Light Fixtures**

6.5.4.1 A lighting fixture is the frame or housing for holding the lamp in position and for protecting it from damage. Light fixtures are to be selected and located to maintain the minimum foot-candle requirements for safety and security purposes. Beyond that, aesthetic considerations should take precedence.

6.5.4.2 Lighting fixtures are grouped into five general categories as defined below. Figure 1-6.28 includes examples of four of the categories.

6.5.4.2.1 **Cutoff Lighting.** Cutoff lighting refers to the large shoebox-shaped fixtures placed on tall poles and used to illuminate streets and parking lots. They are designed to cut off light traveling to the top and sides of the fixtures, concentrating it down onto the parking lot. The fixtures reduce the spillover of light where it is not wanted.

6.5.4.2.2 **Utility Lighting.** Utility lighting refers to simple, inexpensive fixtures that are used in industrial areas of low visibility.

6.5.4.2.3 **Bollard Lighting.** Bollard lighting refers to fixtures that are mounted on or in a short post to illuminate pedestrian areas. They can also be used as physical barriers between pedestrian and vehicular traffic.

6.5.4.2.4 **Spotlighting.** Spotlighting refers to high intensity fixtures that concentrate light into a narrow beam and are used to highlight signs and other important objects. Spotlights should be screened by landscaping or other methods so they are inconspicuous during the day.

6.5.4.2.5 **Wall-Mounted Lighting.** Wall-mounted lighting refers to fixtures attached to the wall of a building or a wall bordering a walkway or stairway.

6.5.4.3 **Light Poles.** The light fixture size must be proportional to the intended pole height. Light poles will be consistent and provide uniformity throughout the installation. The pole height shall be determined by their intended function.

6.5.5 **Lamp Characteristics**

Select lamps by evaluating the optical control, location, efficiency, lamp color rendition, lamp life, cost, and maintenance.
6.5.5.1 **Incandescent**

- Superior color rendition
- Inexpensive
- Good optical control
- Short life span
- Lowest efficiency

6.5.5.2 **High Pressure Sodium**

- Poor color rendition
- Broad application
- Low maintenance
- Superior optical control
- Superior life span
- Excellent efficiency
- Expensive

6.5.5.3 **Low Pressure Sodium**

- Poor color rendition
- Good efficiency
- Superior life span
- Expensive

6.5.5.4 **Fluorescent**

- Good color rendition
- Poor optical control
- Good life span
- Good efficiency in mild climates
- Produces glare

6.5.5.5 **Metal Halide**

- Superior color rendition
- Superior optical control
- Efficiency better than mercury vapor but poorer than pressure sodium.
- Expensive

6.6 **UTILITY STANDARDS**

6.6.1 The visual and environmental impact of utilities will be minimized on the installation (Fig. 1-6.29). Utility systems standards provide the basic infrastructure of power,
communication, water, and sewer services necessary for the operation of the installation. Utilities primary impact on the visual quality is the result of the clutter of overhead utility lines and poorly designed storm drainage systems.

6.6.2 The systems will be designed to minimize maintenance and repair. The result is a more sustainable utility system that will promote the overall sustainability of the installation. The primary components of the utility system and standards for their location and design are included below.

6.6.3 **Overhead Transmission Lines Standards**

6.6.3.1 Unsightly overhead utilities will be relocated underground wherever possible to reduce negative visual impacts, and reduce maintenance and repair requirements. Underground utilities are also desirable for protection from terrorist or other enemy attack. When underground locations are not possible, the negative visual impacts must be minimized to the maximum extent possible by using the following design techniques:

6.6.3.2 **Overhead Transmission Lines Location.** Overhead transmission lines will be aligned along edges of land use areas to avoid dividing an area and creating gaps or unusable areas. They will conform to natural landforms that can be utilized to screen them from public view. Hills will be crossed obliquely rather than at right angles. Alignments along hillcrests or steep grades are to be avoided.

6.6.3.3 **View Screening.** Minimize long views or silhouette views of overhead transmission lines from along roads and other public viewing areas. Avoid the “tunnel effect” of long, straight, uninterrupted views along the alignment by clearing vegetation only within the right-of-way that threatens the overhead lines. Jog the alignment at road crossings and periodically undulate and feature plant materials along the edges of the right-of-way.

6.6.4 **Distribution Lines.** Locate power distribution lines, to the maximum extent possible, underground to minimize negative visual impact, reduce maintenance, and protect from terrorist or other enemy attack. If overhead, they should be located out of view from main public visibility areas or screened to be as unobtrusive as possible (Fig. 1-6.30). Avoid alignments of overhead lines along major circulation corridors. Use minor streets, alleyways, rear lot lines, and vegetation or topography that provide screening and minimize visual impact. Minimize the number of poles and pole height, and use poles that blend into their surroundings to reduce
visual impact. Poles are to be multi-functional for power, telephone, cable television, street lighting, etc., to reduce visual clutter.

6.6.5 **Substations and Transformers.** Substations and transformers will be designed and located to minimize their visual impact and be compatible with the character of their setting. Substations are best located in industrial use areas rather than in major public circulation areas. They are to be screened from public view by using plant material, berms, and walls.

6.6.6 **Sewer and Water**

6.6.6.1 All sewer and water lines must be underground.

6.6.6.2 Sewage treatment facilities should be located 1,250 ft. (0.38 Km) distance and in a downwind direction from all inhabited facilities.

6.6.6.3 Treatment facilities will be screened from view of major roads and other installation facilities by plant material, berms, walls, and fences.

6.6.6.4 Water Storage Tanks. A water storage tank that has visual strength in its form can be used as a focal point or identifying landmark that can provide a sense of orientation within the installation.

6.6.6.4.1 Water Storage Tank Painting. With the following exception, water storage tanks will be finished with a solid tan or sky blue color (see Appendix L). Water storage tanks on airfields or in the proximity of an airfield and situated in a location that could cause an adverse effect to an aviator flying a pattern or on approach will be painted in a checkerboard pattern using aviation orange and white coloring as directed by Federal Aviation Administration **Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting.** (See paragraph 121 for paint standards.). Graphics and artwork on the water storage tank shall be limited to the installation name and the Installation Unit Crests as approved in the Installation Design Guide.

6.6.6.4.2 Water Storage Tank Lighting. Lighting of water storage tanks will be as prescribed in **Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting.**

6.6.6.5 Fire hydrants will be nutmeg brown in color with a reflective finish (See Appendix L, paragraph L.7.). Fire Hydrants
will be visible and free of screening (See Fig. 1-6.31.). Further, following the National Fire Protection Association (NFPA) 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants, a hydrant classification color accent band will be painted on the bonnet indicating the rated capacity (at 20 pounds per square inch [psi] [1.4 bar] residual pressure) in accordance with Table 6.2.

<table>
<thead>
<tr>
<th>Class</th>
<th>Rated Flow Capacity Gallons Per Minute (gpm)/Liters Per Minute (L/min)</th>
<th>Accent Band Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class AA</td>
<td>1500 gpm (5680 L/min) or greater</td>
<td>Light Blue</td>
</tr>
<tr>
<td>Class A</td>
<td>1000-1499 gpm (3785-5675 L/min)</td>
<td>Green</td>
</tr>
<tr>
<td>Class B</td>
<td>500-999 gpm (1900-3780 L/min)</td>
<td>Orange</td>
</tr>
<tr>
<td>Class C</td>
<td>0-499 gpm (1899 L/min)</td>
<td>Red</td>
</tr>
</tbody>
</table>

Table 6.2 - Fire Hydrant Rated Flow Capacity

6.6.7 Storm Drainage

6.6.7.1 Installation Storm Drainage Systems will be appropriate to the character of development they serve. Storm drainage systems in densely developed areas require curbs, gutters, and underground lines. Storm drainage systems in low-density areas can utilize drainage swales and ditches that are contoured to be compatible with the natural landform. Where retention ponds are required, they are to be designed to appear as a natural amenity that is part of the natural contour of the land, rather than a square or rectangular hole in the ground. Retention ponds that are designed to be dry most of the time can be used for recreational purposes or as open space. In either case, the areas, where possible, will be designed to conform to the natural contours of the land. See Chapter 2, paragraph 2.3.3.

6.6.7.2 Large hard surfaced parking lots should have drainage at the entry to prevent water draining into adjacent streets.

6.7 ARMY STANDARDS

6.7.1 The cited Army Standards shall be met.

- DoD 4525.8-M, DoD Official Mail Manual
- AR 420-49, Utility Services
• AR 420-70, *Buildings and Structures*

• AR 420-72, *Transportation Infrastructure and Dams*

• UFC 4-010-01, *Design: DoD Minimum Antiterrorism Standards for Buildings*

• *Americans with Disabilities Act Accessibility Guidelines (ADAAG)*

• *Uniform Federal Accessibility Standards (UFAS)*

• TM 5-807-10, *Signage*

• *Manual of Uniform Traffic Control Devices (MUTCD)*

• MTMC Pamphlet 55-14, *Traffic Engineering for Better Signs and Markings*

6.8 REFERENCES

6.8.1 The following references are provided for guidance.

• AR 1-33, *Memorial Programs*

• AR 840-1, *Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques*

• UFC 3-210-04, *Design: Children's Outdoor Play Areas*

• TI 811-16, *Lighting Design*

• TM 5-663, *Child Development Center, Play Area Inspection and Maintenance Program*

• National Fire Protection Association (NFPA) 291, *Recommended Practice for Fire Flow Testing and Marking of Hydrants*

• Advisory Circular AC 70/7460-1K, *Obstruction Marking and Lighting.*

• UFGS, Division 12 – FURNISHINGS, UFGS 129300, *Site Furnishings*
• Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: Lighting for Exterior Environments (RP 33-99)
7.1 INTRODUCTION

7.1.1 Accommodating the need for security and antiterrorism is a significant concern for all military facilities design. Army Security and Antiterrorism Standards will be integrated into the total project. Design of protective elements will seek to visually and functionally enhance and complement the design of a facility. Site elements such as fences, courtyards, screen walls, swales, berms, planters, and retaining walls can be used effectively for facility protection (Fig. 1-7.1). These design elements will be designed to provide visual harmony with the main facility, producing architectural compatibility through consistent use and application of materials, forms, and colors.

7.1.2 Design decisions to meet security and antiterrorism requirements and resolve conflicts will require coordination among the design disciplines and appropriate functional areas to include land planners, landscape architects, architects, intelligence personnel, security personnel, Force Protection Officer, facility users, and engineers. The designers must work to balance force protection requirements with all other requirements that impact design and development. These include the Americans with Disabilities Act Accessibility Guidelines (ADAAG), the Uniform Federal Accessibility Standards (UFAS), National Fire Protection Association (NFPA) Codes, and all applicable local building codes, ordinances, and Host Nation Standards. The design team will also consult security personnel to determine whether portions of the design documents are subject to access limitations.
7.2 BUILDING SITING AND DESIGN STANDARDS

7.2.1 To minimize the likelihood of mass casualties from terrorist attacks against buildings occupied by DoD personnel, DoD has developed the *UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings*. UFC 4-010-01 establishes the building antiterrorism standards for all DoD components.

- Mandatory DoD antiterrorism standards for new and existing inhabited buildings are contained in Appendix B of *UFC 4-010-01*.
- Mandatory DoD antiterrorism standards for expeditionary and temporary structures are contained in Appendix D of *UFC 4-010-01*.
- Additional recommended measures for new and existing, inhabited buildings are contained in Appendix C of *UFC 4-010-01*.

7.2.1.1 Implementation of the mandatory standards is obligatory for all new construction regardless of the funding source. These standards apply to FY 2004, and all subsequent fiscal years, for projects involving new construction and major renovations for inhabited structures. The standards will be reviewed before any site planning or design is initiated.

7.2.1.2 Minimum Standoff Distances and Separation for Buildings:

- The minimum standoff distances and separation for new and existing buildings are found in Table B-1 of *UFC 4-010-01*.
- The minimum standoff distances and separation for expeditionary and temporary structures are found in Table D-1 of *UFC 4-010-01*.

7.2.1.3 The DoD minimum standards, when applicable, may be supplemented by more stringent Force Protection building standards to meet specific threats inherent in the geographical area where the facility is to be constructed. Those additional requirements may be established either by standards for specific Combatant Commanders or based on Risk and/or Threat Analysis.

7.2.1.4 When the minimum standoff distances cannot be achieved because land is unavailable, the standards allow for building hardening to mitigate blast effects.

7.2.2 Implementing Design Standards.
7.2.2.1 Additional guidance on applying the DoD minimum antiterrorism standards for buildings can be found in UFC 4-010-02, Design (FOUO): DoD Minimum Standoff Distances for Buildings. This document includes Tables 1 and 2, which identify the minimum standoff distances and separation for new and existing buildings and expeditionary and temporary structures. The last column of each table, titled “Applicable Explosive Weight”, includes specific explosive weights in kilograms (pounds) of TNT, making these tables For Official Use Only (FOUO).

7.2.2.2 Access to UFC 4-010-02 can be gained through the U. S. Army Corps of Engineers’ Protective Design Center (PDC) web-based library. A user name and password are required. Site entry is restricted to U.S. Government agencies and their U.S. contractors. However, many of the publications listed on the site are approved for public release and can be found on the web at the Publications of Headquarters, Corps of Engineers web page or on the web at the ProjNet Unified Facilities Criteria web page.

7.2.3 Orientation of Buildings on a Site. The following standards will be given consideration when determining the orientation of a building.

7.2.3.1 Deny aggressors a clear "line of sight" to the facility from on or off the installation where possible. Protect the facility against surveillance by locating the facility outside of the range or out of the view of vantage points.

7.2.3.2 Protect against attack by selecting perimeter barriers to block sightlines such as obstruction screens, trees, or shrubs. Non-critical structures or other natural or man-made features can be used to block sightlines.

7.2.3.3 Create "defensible space" by positioning facilities to permit building occupants and military police to clearly monitor adjacent areas.

7.2.3.4 Design vehicular flow to minimize vehicle bomb threats, avoid high-speed approach into any critical or vulnerable area.

7.2.3.5 Avoid siting facilities adjacent to high surrounding terrain, which provides easy viewing from nearby non-military locations.
7.3 FENCING STANDARDS

7.3.1 Use fences as protective measures against specific threats. They are most appropriately used to define boundaries and to deter penetration of a secure area (Fig. 1-7.2). A fence will assist in controlling and screening authorized access to a secured area. Fences also serve the purposes listed below:

7.3.1.1 As a platform for the Intrusion Detection System.
7.3.1.2 As a screen against explosive projectiles.
7.3.1.3 To stop moving vehicles, where reinforced to do so.

7.3.2 Plants with tall growth habits and/or large mature growth will be located well away from security fences.

7.3.3 See also Chapter 6, Site Elements, paragraph 6.3.7 Walls and Fences, 6.3.10 Planters, and 6.3.13 Bollards. Use security fence meeting State Department standards, based on facility priority. The use of chain link fence will be held to a minimum in the cantonment area.

7.4 LANDSCAPE FORCE PROTECTION STANDARDS

7.4.1 Landscaping standards for buildings must not be ignored because of standoff distances. The landscape design will enhance the overall attractiveness of the facility while still providing or enhancing the objective level of security. See Chapter 5.

7.4.2 Establish clear zones along both sides of security fencing. Vegetation in the clear zone must not exceed four inches in height. (DoD 0-2000.12-H, Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence, Appendix EE, Table EE-4).

7.4.3 Groupings of planters, berms, trees and other vegetation should be strategically located to prevent penetration of an attack vehicle into a secure area (Fig. 1-7.3).

7.4.4 Groupings of berms, trees, and other vegetation should be located in relation to a building to diminish the concussive effect of an external explosion on the building.

7.4.5 Plant material that can provide concealment of objects larger that 6 inches high will not be used adjacent to high security structures or fence lines or with in 33 feet (10 meters) of a facility.
with an occupancy load as specified by force protection regulations.

7.4.6 Use dense, thorn-bearing plant material to create natural barriers to deter aggressors.

7.4.7 Landscaping material shall be used to screen outdoor play and recreation areas as well as the activities in side inhabited facilities from public (off-installation) view. (Fig. 1-7.4)

7.4.8 **Signage.** Designers will balance the need for signs that identify, locate, and direct residents and supported personnel to installation assets, versus the need to discourage and frustrate hostile intelligence gathering and access. One method of achieving this balance could be to direct people to a community support or information center to obtain directions to high security activities. Another could be “All incoming personnel and visitors report to _______ street address”.

7.4.9 Place trash containers as far away from the facility as possible. See 6.3.8 Trash and Recycling Receptacle Standards. Antiterrorism/Force Protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas (UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings, Table B-1).

7.4.10 Unobstructed Space. Ensure that vegetation and site features within 10 meters (33 feet) of inhabited buildings do not conceal form observation objects of 150mm (6 inches) in height. (UFC 4-010-01, Appendix B, Paragraph B-1.2). This does not preclude landscaping within the unobstructed space, but it will affect the design and plant selection.

**7.5 EXTERIOR LIGHTING FORCE PROTECTION STANDARDS**

Provide lighting systems for security operations with illumination for visual and Closed-Circuit Television (CCTV) surveillance of boundaries, sensitive inner areas, and entry points. When CCTV is used as part of security operations, the lighting system will be coordinated with the CCTV system. The specific installation environment and the intended use determine lighting system requirements. Often two or more types of lighting systems are used within a single area. The standard for security lighting is UFC 4-010-02, Design (FOUO): DoD Minimum Standoff Distances for Buildings. For web site access refer to paragraph 7.2.2.2 above.
7.6 BERM STANDARDS

7.6.1 Use berms for the following force protection functions (Fig. 1-7.5):

- Define boundaries of property or boundary limits.
- Provide a barrier to moving vehicles.
- Hinder pedestrian movement.
- Intercept projectiles.
- Obstruct lines of sight.

7.6.2 Berms used to block lines of sight or projectiles will be high enough to achieve those objectives or may be combined with landscaping or other construction elements. Detailed design guidance is contained in UFC 4-020-03FA Security Engineering: Final Design. For website access refer to paragraph 7.2.2.2 above.

NOTE: This Army Technical Manual is a "For Official Use Only (FOUO)" document and is not accessible on the Army Corps of Engineers publications website. A copy of the manual can be acquired by ordering it through your DoD standard publications account.

7.7 GATES AND ENTRANCES (ACCESS CONTROL POINTS [ACP]) STANDARDS

7.7.1 Installation entry points are key components in the Force Protection security program. The most effective entrances accommodate the functions of observation, detection, inspection, access control, and disablement of hostile personnel and vehicles, while containing the vehicles and pedestrians until access is granted. These areas are some of the most important installation features in the creation of a sense of arrival for both installation personnel and visitors. It is important that these areas present a positive public image (See paragraph 4.8.). (Fig. 1-7.6)

7.7.2 The Headquarters, Department of the Army force protection standards for ACPs is found in UFC 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points and The Army Standard for Access Control Points (ACPs) (See paragraphs 3.2.2.8.1.1 and 3.2.2.8.1.2.).

7.7.3 Physical Security Equipment Standards

7.7.3.1 The Product Manager, Force Protection Systems (PM-FPS) under DoD Directive 3324.3 is assigned the mission of developing, fielding, and supporting physical security equipment
throughout its life cycle for the Army, Joint Services, and other Government agencies.

7.7.3.2 The DoD Directive 3324.3 assigns specific areas of responsibility which include: interior FPS, C2 systems, security lighting, force protection systems, tactical security equipment, barrier and systems, and interior and exterior robotics. Management functions include responsibility for research, development, acquisition, fielding, and logistics support of FPS except for those functions specifically assigned to other Services or to the Defense Threat Reduction Agency (DTRA). The PM-FPS homepage and the DA approved equipment Blank Purchase Agreements (BPAs) are listed below.

- [Product Manager – Force Protection Systems (PM-FPS) Homepage](#)
- [DA Approved FPS Equipment Blank Purchase Agreements (BPAs)](#)

7.8 ARMY STANDARDS

7.8.1 The cited Army Standards shall be met.

- [UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings](#)
- [UFC 4-010-02, Design (FOUO): DoD Minimum Standoff Distances](#).
  (This document is a "For Official Use Only [FOUO]" publication. For web site access refer to paragraph 7.2.2.2 above.

- [Uniform Federal Accessibility Standards (UFAS)](#)
- [Americans with Disabilities Act Accessibility Guideline (ADAAG)](#)
- [DoD Instruction 2000.16, DoD Antiterrorism Standards](#)

7.9 REFERENCES

7.9.1 The following references are provided for guidance.

- [DoD Handbook 2000.12-H, Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence](#), February 1993 (This Handbook is a "For Official Use Only [FOUO]" publication. Users may contact the Point of Contact posted at the
following website to obtain a copy of the Handbook).
http://www.dtic.mil/whs/directives/corres/html/o200012h.htm

- Army Regulation (AR) 525-13, The Army Force Protection Program (Available only through the Army Knowledge Online web portal).

- UFC Security Engineering series are, UFC 4-020-01FA, UFC 4-020-02FA, UFC 4-020-03FA, and UFC 4-020-04FA. The four volumes cover; Project Development, Concept Design, Final Design, and Electronic Security Systems respectively. UFC 4-020-04FA is available via the internet. Access to the other UFC’s can be gained through the U. S. Army Corps of Engineers’ Protective Design Center (PDC) web-based library. A user name and password are required. Site entry is restricted to U.S. Government agencies and their U.S. contractors. Also, a copy of the manuals can be acquired via a standard publications account.
Installation Name

Installation: Insert Selected Artwork

The Army Installation Design Guide for Installation Name

Prepared By: Date
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MODEL ARMY INSTALLATION DESIGN GUIDE (IDG)

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The Army Installation Design Guide (IDG) is a hyperlinked document. A hyperlink is specially formatted text that contains an address (in the document, within another document, or on the internet) that when “followed” or “clicked on,” takes the reader to that link. Hyperlinks are shown in the color blue and may or may not be underlined in blue depending on the format of a particular document. Hyperlinks within the IDG link to other documents, reference tables, appendices, graphics and maps, and the Internet for further reference or in-depth study on a particular issue.

Users of the IDG are presented with a hyperlinked table of contents. Each name is hyperlinked directly to the beginning of the document that it indicates. The table of contents is expandable and hyperlinked to each section and subsection.

Click on the hyperlinks to the right to enter the IDG table of contents.
ES.1 PURPOSE

The purpose of the *Army Installation Design Standards* is to provide Army standards and serve as a tool for implementing those standards (Fig. ES.1).

- The design standards for site planning, buildings, vehicular and pedestrian circulation, landscaping, site elements (i.e. signage, utilities), force protection, and Sustainable Design are provided for incorporation into each Army installation.

- The framework for implementation is the Army Installation Design Guide (IDG). Each installation will imitate the IDG processes in the *Army Installation Design Standards* in the development of their installation specific IDG.

ES.2 BACKGROUND

ES.2.1 The *Army Installation Design Standards* follows the concept established in the Joint Service *Unified Facilities Criteria Installation Design* manual.
ES.2.2 Research was conducted to incorporate into Army standards the best practices from other organizations such as the Air Force, Navy, AAFES, GSA, National Park Service, Federal Highway Administration, and various city and county governments, and associations.

ES.2.3 Existing Army Installation Design Guide were also reviewed for their application of procedures, examples, and benchmarks for IDG implementation Army-wide.

**ES.3  IDG METHODOLOGY**

ES.3.1 The IDG provides standards and guidelines to installation decision makers, contracted and in-house planning and design professionals, installation maintenance personnel, and others. The IDG sets interior and exterior standards and planning criteria to be integrated into all proposals, design and construction contracts, renovation, maintenance, or repair projects performed on the installation or its properties.

ES.3.2 The following paragraphs present an overview of the steps involved in developing an installation specific IDG. The IDG promotes a sense of arrival, functional compatibility, visual order, enhances site assets, relates the natural and man-made environment, and achieves consistent architectural themes throughout the installation and where applicable its sub-installations.

**Step 1.  Installation Profile**

Initially an installation profile is created in which the installation setting, existing land use, and proposed land use are detailed to include all applicable sub-installations.

**Step 2.  Visual Surveys**

The first survey establishes the visual zones and themes of the installation. The second survey documents the liabilities and assets within each visual zone.

*Fig. ES.2 - Example of Themes and Visual Zones*
Step 3. Visual Zones and Themes

Information gathered is recorded and used to delineate visual zones. Zones with similar visual characteristics are grouped together to form a broader category called themes. Visual characteristics define a "look and feel" of an area together with the dominant features that define its image. Typical visual characteristics include unique buildings, vehicular and pedestrian corridors, functional use, natural features, and spatial relationships (Fig. ES.2).

Step 4. Assets and Liabilities

Each visual zone is then defined for its assets and liabilities. Subsequently, a functional analysis is prepared.

Step 5. Recommendations

Recommendations are developed to address the liabilities identified and to enhance the assets noted in accordance with Army standards and the IDG goals and objectives. Recommendations are in the form of specific projects that are utilized to prepare a prioritized projects list for approval by the installation Real Property Planning Board.

ES.4 RESPONSIBILITIES

ES.4.1 Assistant Chief of Staff for Installation Management (ACSIM):

- Establish Army facility standards and approve deviations from the standards.
- Approve Army Installation Design Standards Implementation Plan.
- Approve Army Installation Design Standards Investment Strategy.
ES.4.2 **Director Installation Management Agency (IMA):**

- Develop and implement the Army Installation Design Standards Implementation Plan.
- Develop and implement the Army Installation Design Standards Investment Strategy.
- Ensure compliance with the Army Installation Design Standards.
- Maintain electronic newsletter for communicating changes in standards.

ES.4.3 **Garrison Commander:**

- Develop the installation's IDG.
- Chair installation Real Property Planning Board to review and approve projects established on the Prioritized Improvement Projects List to meet Army standards.
- Submit Prioritized Improvement Projects List for approval and funding IAW Director, IMA instructions after review and approval by Senior Mission Commander.
- Enforce IDG standards.

ES.4.4 **Senior Mission Commander:**

- Review and approve IDG.
- Review and approve RPPB prioritized improvement projects list recommendations to meet Army standards prior to submission to IMA Region Director.

ES.4.5 **Major Army Command/Tenant:**

- Participate in installation Real Property Planning Board.
- Participate in design and planning charrettes.
- Determine project functional requirements.
- Participate in design reviews.
- Participate in development of Prioritization Projects List.
1.1 PURPOSE

1.1.1 A military installation conveys a visual image established by its architectural and historical character, arrangement of facilities, circulation patterns, and features in the landscape. This image can be clear, orderly, logical and attractive; or cluttered, confused, and unattractive.

1.1.2 The purpose of the Army Installation Design Guide (IDG) is to provide design guidance for standardizing and improving the quality of the total environment of the installation. This includes not only the visual impact of features on the installation and but also the impact of projects on the total built and natural environment. The improvement of the quality of visual design and development and use of sustainable design and development practices have a direct and future impact on the quality of life for those who live, work, or visit the installation.

1.1.3 The IDG includes standards and general guidelines for the design issues of site planning; architectural character, colors and materials; vehicular and pedestrian circulation; and landscape elements, including plant material, seating, signage, lighting, and utilities. The design guidelines incorporate sustainable design, quality of design, anti-terrorism, low maintenance, historical and cultural considerations, durability, safety, and compatibility.

1.2 GOAL

The goal of the IDG is to provide a clear, comprehensive approach to establish and maintain a positive visual imagery throughout the
installation and implement appropriate standards. This is accomplished by providing a systematic development process that is defined through description, analysis, synthesis, and implementation.

1.3 OBJECTIVES

The objectives of the IDG are:

1.3.1 To provide a set of general design standards and guidelines that define color, materials, style, signage, and other aspects of design for all visual elements surveyed.

1.3.2 To provide standards and guidelines for the selection of materials for new construction, renovation, maintenance and repair projects.

1.3.3 To provide guidance for accomplishing sustainable development. See Appendix D.

1.3.4 To provide a structured methodology for establishing projects to improve the visual imagery of the installation.

1.3.5 To provide guidance to integrate ATFP standards.

1.4 AUDIENCE

1.4.1 The IDG is to be used by all individuals involved in decision-making, design, construction, and maintenance of facilities (Fig.1.2). The primary users include the following:

1.4.1.1 Senior Mission Commander

1.4.1.2 Garrison Commanders and Staff

1.4.1.3 Installation facility planning and design personnel

1.4.1.4 Installation facility maintenance personnel

1.4.1.5 Installation Management Agency and Region

1.4.1.6 U.S. Army Corps of Engineers project managers, design, and construction staff

1.4.1.7 Consulting Planners, Architects, Engineers, Interior Designers, and Landscape Architects
1.4.1.8 Supporting agencies such as AAFES, DeCA, DoDDS, MEDCOM, tenants, etc.

1.4.1.9 National Guard

1.4.2 The ultimate success of the IDG is dependent upon the commitment of the above individuals and organizations working as a team to apply the Army standards.

1.5 ORGANIZATION

1.5.1 This Army Installation Design Guide is organized to facilitate the preparation and execution of projects to improve the visual image on the installation and ensure design conforms to Army standards to include sustainability.

1.5.2 Sections 2 and 3 discuss the process, use, and implementation of the IDG.

1.5.3 Section 4 establishes the installation profile. The installation setting, existing land use, and future land use are detailed.

1.5.4 Section 5 addresses the development of installation visual themes and zones. It lists visual themes and zones, specifies assets and liabilities of each zone, and offers recommendations.

1.5.5 Section 6 provides a list of prioritized improvement projects. All projects are addressed in terms of existing conditions, design concept, cost estimate, funding and maintenance impact, and site plan where applicable.

1.5.6 Sections 7 through 12 discuss the six design components that provide the categories used for review and analysis during the visual inventory of the installation. The visual impressions of each zone are categorized according to these six design components.

1.6 WHEN TO USE THE ARMY INSTALLATION DESIGN GUIDE

1.6.1 This IDG provides installation-specific design data. The general design concepts, recommendations, and standards addressed herein are applicable to all Army installations. This document will be used as a reference to acquire recommendations and Army standards on the design of all facilities, new roads, road widening, parking, sidewalks and other pedestrian paths, bicycle paths, Access Control Points (ACP), site furnishing selection and
placement, signage selection and placement, lighting selection and placement, utility corridor selection, and utilities. Clearing of plant materials and planting of new plant materials will be based upon the guidance herein.

1.7  MAINTAINING THE ARMY INSTALLATION DESIGN GUIDE

1.7.1  Since the IDG is a "living document”, keeping it up-to-date and accurate will ensure its continued usefulness. Therefore, it will become necessary to revise it as mission, budget, standards, and other conditions generate new planning and design requirements and in response to facility user feedback.

1.7.2  In accordance with AR 210-20, Master Planning for Army Installations, the installation Real Property Planning Board (RPPB) is the adjudicating body for the Army Installation Design Guide at the installation level. Violations and variances from standards will be reviewed and adjudicated by the RPPB. The Senior Mission Commander will chair an Installation Planning Board (IPB) to review and approve the RPPB’s actions.

1.7.3  Installation: Enter installation specific procedures for maintaining the Army Installation Design Guide.

1.8  RESPONSIBILITIES

1.8.1  As directed by the Secretary of the Army and the Chief of Staff, Army and approved by the Army Installation Management Board of Directors the following responsibilities are established:

1.8.1.1  Assistant Chief of Staff for Installation Management (ACSIM):

- Establish Army facility standards and approve deviations from the standards.
- Approve Army Installation Design Standards Implementation Plan.
- Approve Army Installation Design Standards Investment Strategy.

1.8.1.2  Director Installation Management Agency (Dir IMA):

- Develop and implement the Army Installation Design Standards Implementation Plan.
• Develop and implement the Army Installation Design Standards Investment Strategy.

• Ensure compliance with the Army Installation Design Standards.

• Maintain electronic newsletter for communicating changes in standards.

1.8.1.3 Garrison Commander:

• Develop the installation's IDG.

• Chair Real Property Planning Board (RPPB) to review and approve projects established on the Prioritized Improvement Projects List (Appendix G) to meet Army standards.

• Submit Prioritized Improvements Projects List for approval and funding IAW Director, IMA instructions after review and approval by Senior Mission Commander.

• Enforce IDG standards.

1.8.1.4 Senior Mission Commander:

• Review and approve IDG.

• Review and approve RPPB prioritized improvement projects list recommendations to meet Army standards prior to submission to IMA Region Director.

1.8.1.5 Major Army Command/Tenant:

• Participate in installation Real Property Planning Board.

• Participate in design and planning charrettes.

• Determine project functional requirements.

• Participate in design reviews.

• Participate in development of Prioritization Projects List.
1.9 SUSTAINABLE DESIGN AND DEVELOPMENT

1.9.1 Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice. Protecting our natural resources and reducing our impact on the natural environment is achievable when we create high-performance, healthy (Fig. 1.X), energy efficient (Fig. 1.X), and safe buildings.

1.9.2 The Integrated Design Process. Critical to the success of sustainable design and development is the organization and commitment of the team to engage in the Integrated Design Process. To effect change in building design and operation, the project delivery process itself must become a collaborative effort to integrate design strategies among all disciplines and all players in the project delivery process. Integrated design demands a more inclusive team, working closer together than is traditionally the case. Future building users and facility managers must be invited to join architects, engineers, and planners in developing the vision and goals for new facilities. (Adapted from the HOK Guidebook to Sustainable Design)

1.9.3 Appendix D, Sustainable Design, discusses the sustainable design concept and its application to Army projects. Paragraph D.3 discusses the Sustainable Project Rating Tool (SPiRiT) developed by the U.S. Army Corps of Engineers (USACE). Per the Assistant Secretary of the Army (Installation & Environment) Sustainable Design and Development Memorandum and the Assistant Chief of Staff for Installation Management (ACSIM) endorsement of Sustainable Design and Development initiative, the SPiRiT rating system will be used by design professionals in all new construction, additions, or renovation of Army facilities for rating sustainability.

1.9.3.1 The SPiRiT document (Appendix E) was derived from the U.S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System.

1.9.3.2 Army Rating Standard.

1.9.3.2.1 The SPiRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18, 2003). For all other FY06 and future-year MILCON projects, the minimum SPiRiT rating requirement is "Gold". See Assistant Secretary of the Army memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.
1.9.4 Further information on sustainable design can be obtained at the following websites:

Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website This site provides information on the following topics: documentation and references; sustainable process, tools, products and materials; Sustainable Design and Development Training; and links to various sustainable design and development informational website.

U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website.

Whole Building Design Guide (WBDG) This site provides comprehensive and current information on sustainable design strategies and technologies.

1.10 ARMY STANDARDS

1.10.1 Army Standards and References are included in the last two paragraphs of the following sections and appendices: Section 7, Site Planning Design Component; Section 8, Buildings Design Component; Section 9, Circulation Design Component; Section 10, Landscape Design Component; Section 11, Site Element Design Component; Section 12, Force Protection Design Component; Appendix D, Sustainable Design; and Appendix M, Historic Preservation Guidelines.
2.1 INTRODUCTION

Military installations are hometowns for many of our military families, resources for many veterans and retirees, and an integral part of the surrounding communities. The Army Installation Design Guide (IDG) provides direction for achieving a sense of community, order, tradition, and pride on our installations. This section provides a brief overview of the IDG developmental process and methodology detailed in Unified Facilities Criteria (UFC) 2-600-01, Installation Design.

2.2 THE DESIGN GUIDE PROCESS

2.2.1 The IDG includes a process for analysis, planning, design, and implementation. This process includes the following steps:

2.2.1.1 Setting Goals and Objectives. The installation develops a set of goals and objectives that address the visual requirements of the installation. The goals and objectives provide a pre-determined image that helps create a visually pleasing and optimally functional environment.

2.2.1.2 Conduct Visual and Spatial Surveys. Two visual surveys are performed in the preparation of the IDG. The first survey establishes the visual zones and themes of the installation. The second survey documents the assets and liabilities within each visual zone. Chapter 5 of UFC 2-600-01 details the method for conducting the installation visual survey.
2.2.1.2.1 Establish Visual Zones and Themes

2.2.1.2.1.1 The Information gathered during the first survey is used to establish the visual zones of the installation. The visual zones are delineated by the visual characteristics of an area defined as the "look and feel" of an area together with the dominant features that help define its image. A functional analysis of each zone organizes the visual impressions and assesses their functional relationships to determine the visual character and unifying motif. Typical visual characteristics include unique buildings, vehicular and pedestrian corridors, functional use, natural features, and spatial relationships.

2.2.1.2.1.2 Visual zones with similar characteristics are then grouped together to form a broader category called themes. Example themes include, community life theme, operations support theme, buffer/open space theme, and industrial theme.

2.2.1.2.2 Determine Assets and Liabilities. The second survey a visual zone inventory is conducted. During the survey each visual zone is analyzed for specific visual impacts. The objective of the inventory is to define the visual assets and liabilities within the visual zone.

2.2.1.2.2.1 Assets. Assets are positive visual elements, design elements, or features that enhance the surroundings, either visually or functionally.

2.2.1.2.2.2 Liabilities. Liabilities are negative visual elements, design elements, or features that detract from the visual image or functionality of the surroundings. Liabilities should be corrected through appropriate design measures and are the basis for recommendations for improvement.

2.2.1.3 Recommendations and Implementation Plan

The assessment of each visual zone includes recommendations to correct liabilities and where desired to enhance assets. The recommendations are in the form of specific projects and are described in detail Section 6, Improvement Projects of the IDG.

2.2.2 Design Components

The following six design components, described in sections 7 through 12, provide guidelines and standards from which to conduct the visual zone review and analysis.
Section 7, Site Planning
Section 8, Buildings
Section 9, Circulation
Section 10, Landscape
Section 11, Site Elements
Section 12, Force Protection

2.2.3 Design Principles. The visual inventory and analysis requires an understanding of basic design principles. These design principles are discussed in Section 3, paragraph 3.4.

2.2.4 Visual Elements. The basic design principles are used to define the visual elements described in Section 3, paragraph 3.5. The assessment and classification of visual elements follows basic design principles describing "good" (positive visual elements) and "not so good" (negative visual elements) design.

2.3 USING THE DESIGN GUIDE

2.3.1 Use this IDG in determining the general design and construction considerations inherent in the preparation of project plans. The IDG provides design guidelines and Army-wide design standards intended to be used in all maintenance, repair, renovation, and new construction projects. The IDG applies to all projects, regardless of the funding source.

2.3.2 The following steps illustrate how the design guide is used for the preparation of plans for new construction, renovation, maintenance and repair projects on the installation (Fig. 2.X):

2.3.2.1 Step 1: Review the Installation Profile information included in this IDG (Section 4).

2.3.2.2 Step 2: Review the IDG analysis criteria information (Section 3) including design goals and objectives, visual elements, and design principles.

2.3.2.3 Step 3: Review the applicable references, guidelines, and standards of the design components. These include site planning, buildings, circulation, landscaping, site elements, and force protection and are discussed in Sections 7 through 12 respectively.

Fig. 2.X – Using the Design Guide
2.3.2.4 Step 4: Review the information and description of the installation themes in Section 5, paragraph 5.2.

2.3.2.5 Step 5: Select the zone where the project will be located from Section 5, Visual Themes and Zones. Review the assets, liabilities, and recommendations for that zone.

2.3.2.6 Step 6: Select the appropriate guidelines or standards from the design components addressed in Sections 7 through 12.

2.3.2.7 Step 7: Assemble all materials gathered in steps 1 through 5 above.

2.4 IMPLEMENTATION

2.4.1 IDG Review and Approval

*Installation - Enter review and approval procedures at the installation. The final approval authority at the Garrison is the Garrison Commander.*

2.4.2 Compliance

2.4.2.1 For the IDG to work optimally as a management tool, it is essential that the Master Planner or designated representative establish an understanding of the IDG among the parties concerned with its use. This can best be established at the RPPB level where all installation principles are represented. The Directorate of Public Works (DPW) staff Master Planner or designated representative shall insure that the guidelines and requirements of the IDG are readily available to, and understood by, all parties involved in the design of new facilities, design of additions or alterations to existing facilities, or maintenance.

2.4.2.2 The Master Planner or designee, acting in support of the RPPB, is the first level reviewer of projects (SRM, MCA, and NAF to include Design Build) and other requests for actions that involve compliance with IDG guidelines and standards.

2.4.2.3 The Garrison Commander, supported and advised by the RPPB, is the final authority in enforcement of the IDG guidelines and standards.
2.4.2.4 The Installation Planning Board chaired by the Senior Mission Commander, will monitor development of the installation planning process and provide guidance to other installation boards and the Garrison Command for areas such as:

- Strategic Planning,
- Real Property Planning,
- Range Planning, and
- Communications Planning.

2.4.3 **Project Approval**

2.4.3.1 Project requests to include a 4283 shall be submitted to the DPW or equivalent and will include the required Design Team IDG Checklist discussed below.

2.4.3.2 Design Team IDG Checklist.

2.4.3.2.1 The Design Team IDG Checklist is to be completed by the design team to assure the guidelines and standards have been considered in the design process. The Design Team IDG Checklist is provided in [Appendix A](#).

2.4.3.2.2 The Designer of Record or Design Agent shall provide a copy of the completed checklist to the Master Planner, together with a signed certification statement with each design submittal. The checklist along with concept site plans and elevations for each design submittal shall be provided to the Master Planner for review. If the Master Planner or designated representative concurs, the plan and the signed checklist are forwarded to the RPPB for final approval.

2.4.3.2.3 The accepted checklist shall become a part of the project record files.

2.4.4 Self-help Projects and Occupant Purchased and Installed Site Furnishings and Features Projects.

*Installation* - Enter local procedures for these projects.

2.4.5 **Request for Waiver**

2.4.5.1 A request of waiver form the Design Guide Checklist ([Appendix A](#)) will be submitted to the Master Planning office for approval by the RPPB.
2.4.5.2 A request for waiver from the Army standards shall be submitted to the Assistant Chief of Staff for Installation Management for approval.

2.4.6 **Checklists (optional)**

2.4.6.1 Projects Requirements Checklist (Optional)

It is recommended that this checklist be used as a pre-design planning tool for initiating projects and to present a functional description of the project at MILCON Planning Charrettes and Design Charrettes. The checklist can assist participants of the charrettes in project formulation and documentation. By the nature of the planning process all the data on the forms will not be completed, however, the form should be completed to the greatest extent possible prior to the charrettes. The checklist can also be used to document the results of the planning or design charrettes. The Projects Requirement Checklist is provided at Appendix B.

2.4.6.2 Interior Design Review Checklist (Optional)

It is recommended that the Interior Design Review Checklist be used during review of a Request for Proposal (RFP) submission or an AE or in-house design prior to solicitations. The Interior Design Review Checklist is provided at Appendix C.

2.4.7 The requirement to use the IDG as a design tool in all facility planning, design, and construction should be included in the Request for Proposals on new projects, Scopes of Work for new projects, and maintenance agreements.
3.1 INTRODUCTION

3.1.1 The Army Installation Design Guide process depends upon the development of visual goals and objectives and the identification of visual elements. Goals and objectives provide the desired visual context of the installation.

3.1.2 Basic design principles are used to assess, define, and classify visual elements. This assessment becomes the design criteria used to determine the visual character of the installation. These design criteria are used for design decisions in the review of existing visual context and determination of project recommendation.

3.2 GOALS, OBJECTIVES, AND RECOMMENDATIONS

Installations: List goals, objectives, and recommendations. These goals and objectives should reflect the goals, intent, and vision of the Real Property Master Plan.

Chapter 4 of the UFC 2-600-01 discusses the goals, objectives, and recommendations process and gives examples.

3.3 IDENTIFICATION AND CLASSIFICATION OF VISUAL ELEMENTS

3.3.1 Basic design principles define visual elements and assess their character.
3.3.2 The assessment and classification of visual elements follows basic design principles describing "good" and "not so good" design. Their assessment becomes the design criteria used to determine the visual character of the installation.

3.4 DESIGN PRINCIPLES

The visual inventory and analysis requires an understanding of basic design principles. The primary principles are:

- **Scale** - The proportional relationship of humans to their spatial environment. The scale should result in a comfortable relationship for the user and will vary as space, size and activities vary (Fig. 3.X).

- **Form** - The size and shape of mass. Individual forms should be designed to complement one another and the environment.

- **Function** – The use of a space or an area. Function is gauged by the degree to which the space works for its intended purpose.

- **Color** – All elements of the visual environment have color. The use and arrangement of colors greatly determine the visual impact of all elements.

- **Texture** – All elements of the visual environment have texture. The use and blending of textures greatly impact the visual environment.

- **Unity** – All elements of the visual environment should blend to complement one another. Repetition of scale, form, color, and texture results in a unified visual impression.

- **Framing** – All views include a ground plane, side planes, and overhead plane. The relationship of planes changes as the individual moves through the environment (Fig. 3.X).

- **Axis** – An axis is a linear progression of space connecting two or more dominant features.

- **Terminus** – A terminus is the end of an axis and is typically defined by a dominant feature such as a building.
• **Balance** – Visual elements are composed to be symmetrical or asymmetrical. In either case, visual elements should be sized and located to provide visual balance (Fig. 3.XX).

• **Sustainability** - Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice (See Appendix D).

### 3.5 VISUAL ELEMENTS

The visual elements, described below, elements include manmade and natural features and their inter-relationship. This Army Installation Design Guide provides guidance on how to recognize the visual impacts of the installation and how to improve upon them if warranted.

• **Natural Characteristics** - Regional and site characteristics that have been preserved and enhanced as a part of the installation.

• **Edges and Boundaries** - Linear elements such as walls, fences, or trees create separation of use and activities.

• **Buildings and Structures** - Typically the most dominant features of an installation. Their location and design characteristics determine the primary visual image.

• **Activity Nodes** - Centers of activity that attract people on a daily basis.

• **Landmarks** - Visually or historically prominent features such as towers, statues, static displays, or buildings that provide identity and orientation of place.

• **Entrances and Gates** - Provide the first and last impression of the installation.

• **Circulation System** - Includes streets, railroad tracks, trails, sidewalks, parking lots, driveways, delivery areas, and bicycle paths. The circulation system utilizes a large amount of space and creates significant visual impact.
• **Trees and Other Vegetation** - Trees and other vegetation frame views, provide visual screens, shade, color, and interest in the installation.

• **Street Trees** - Street trees soften, complement, and define the road hierarchy, and improve the overall visual quality of the installation.

• **Views and Vistas** - Scenic and attractive views and vistas should be enhanced. Unattractive views should be screened.

• **Open Spaces** - Open space areas create visual impact and can be designed to either separate or integrate adjacent uses.

• **Signage** - A coordinated installation signage plan, addressing both exterior and interior signage, should be developed to facilitate circulation and provide useful information.

• **Utility Corridors** - Utilities should be in corridors and unsightly above ground utilities minimized.

• **Other Elements** - Visual elements other than those above may occur within an installation and should be noted.
Installation: Complete the following: Note - spatial data will be developed/provided in Geographical Information System Spatial Data Standards per Executive Order 12906, Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure (E.O. 12906).

4.1 SETTING

4.1.1 Regional Setting

__________________________________________ is located...

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.2 History of the Installation

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3 Environmental Setting

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.1 Topography

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).
4.1.3.2 Geology

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.3 Soils

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.4 Climate

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.5 Hydrology

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.6 Vegetation

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.7 Wetlands

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.8 Wildlife

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.3.9 Environmentally Sensitive Habitat

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.4 Man-Made Environment

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.4.1 Contaminated Areas

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).
4.1.4.2 Solid Waste Management

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.4.3 Noise

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.1.4.4 Air Quality

(Text, Maps, Sketches, Photographs) (Hyperlinks where appropriate).

4.2 EXISTING LAND USE

4.2.1 Subparagraphs detailing the existing land use.

**Installation:** These paragraphs discuss (in text and maps - hyperlinked where applicable) the current themes and visual zones established by previous IDGs or discuss the existing land use from which themes and visual zones will be developed. Land use information is obtained from the installation's real property master plan (RPMP).

4.3 PROPOSED LAND USE

4.3.1 **Installation:** Subparagraphs detailing the proposed land use. In text format as well as maps, sketches, and photographs where applicable. Land use information is obtained from the installation's real property master plan (RPMP). To assure accurate information is shown, Land use maps shall be updated before inclusion in the Army Installation Design Guide.
5.1 INTRODUCTION

5.1.1 Visual themes and zones are determined after performing the two surveys mentioned in paragraph 2.2. These surveys were conducted using existing installation maps, visual inspection, interviews, questionnaires, and photographs to record impressions of visual and spatial impacts. The data captured was used to define the visual themes and zones of the installation. Figure 5.X presents a graphical portrayal of the installation's visual zones and themes.

Installation: **Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation to meet Army standards.**

Installation: **Develop a visual zone/theme relationship map graphic as depicted in the following example:**
5.2 VISUAL THEMES

5.2.1 Visual themes create a perception of unification within the installation. These themes create design consistency that provides orientation and a "sense of place".

5.2.2 Visual themes are generalized groupings of visual zones that provide the same general use and visual characteristics. Visual themes include broad scale activities that occur on the installation. These activities typically include similar design and layout characteristics. Table 5-1 shows the theme/visual zone relationship throughout the installation.

*Installation:* Complete Table 5-1 as applicable.
TABLE 5-1 THEME/ZONE RELATIONSHIP

<table>
<thead>
<tr>
<th>XXXX THEME</th>
<th>EXAMPLE COMMUNITY LIFE THEME</th>
<th>EXAMPLE INDUSTRIAL THEME</th>
<th>EXAMPLE SUPPORT OPERATIONS THEME</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXX Visual Zone</td>
<td>Family Housing Visual Zone</td>
<td>XXXX Visual Zone</td>
<td>XXXX Visual Zone</td>
</tr>
<tr>
<td>XXXX Visual Zone</td>
<td>XXXX Visual Zone</td>
<td>XXXX Visual Zone</td>
<td></td>
</tr>
<tr>
<td>XXXX Visual Zone</td>
<td>Open Areas Visual Zone</td>
<td>Community Support Visual Zone</td>
<td></td>
</tr>
</tbody>
</table>

5.3 VISUAL ZONES

5.3.1 Visual zones are areas within the installation that include similar visual characteristics. Visual characteristics define a "look and feel" of an area together with the dominant features that define its image. Typical visual characteristics include unique buildings, vehicular and pedestrian corridors, natural features, and spatial relationships.

5.3.2 The following paragraphs present a functional analysis of each of the visual zones. This analysis includes a description of the visual character, a visual analysis map, assets, liabilities, and recommendations for each zone.

5.3.3 The visual analysis maps graphically illustrate the features and constraints that affect the visual character of the zone.

5.3.4 Assets and liabilities are determined according to the following criteria: installation visual goals and objectives (Section 3, para 3.2), design principles (Section 3, para 3.3) and visual elements (Section 3, para 3.4) in relationship to the six design components described in Sections 7 through 12 of this Army Installation Design Guide.
5.3.5 Recommendations are made to correct the liabilities or enhance the assets. These recommendations are used to generate projects that are listed in Section 6, Improvement Projects.

5.4 (NAME OF ZONE) VISUAL ZONE

5.4.1 Visual Character

_Installation:_ Describe the visual character of the zone.

5.4.2 Visual Analysis Map

_Installation:_ Develop a visual analysis map showing items such as:

- Main Entrance
- Circulation
- Focal Points
- Open Space
- Buffer
- Primary Road
- Secondary Road
- Significant Vegetation
- Good Views
- Historical and/or Architecturally Significant Features
- etc.

5.4.3 Assets

_Installation:_ List, where applicable, the assets of the visual zone as they related to the six design components using the design principles and visual elements described within this Army Installation Design Guide. Include pictures of the asset with captions stating the reasoning for the visual element being an asset.

5.4.3.1 Site Planning
5.4.3.2 Buildings
5.4.3.3 Circulation
5.4.3.4 Plant Material
5.4.3.5 Site Elements
5.4.3.6 Force Protection

5.4.4 Liabilities

**Installation:** List, where applicable, the liabilities of the visual zone as they related to the six design components using the design principles and visual elements described within this Army Installation Design Guide. Include pictures of the liability with captions stating the reasoning for the visual element being a liability.

5.4.4.1 Site Planning
5.4.4.2 Buildings
5.4.4.3 Circulation
5.4.4.4 Plant Material
5.4.4.5 Site Elements
5.4.4.6 Force Protection

5.4.5 Recommendations

**Installation:** List the recommendations applicable to each of the six design components that will either enhance the assets or bring the liability to standards and/or within the recommended guidelines. These are the catalyst for developing the projects that will be listed in Section 6, Improvement Projects.

5.4.5.1 Site Planning
5.4.5.2 Buildings
5.4.5.3 Circulation
5.4.5.4 Plant Material
5.4.5.5 Site Elements
5.4.5.6  Force Protection

5.5  (name of Zone) Visual Zone

5.6  (name of zone) Visual Zone
6.1 INTRODUCTION

6.1.1 Section 6 consists of projects generated from the recommendations presented in the visual zone analysis section starting at paragraph 5.4. The projects may consist of enhancement of a single visual element or improvement of an area that includes a variety of visual elements. Depending on the project scope and cost, the projects could include: Military construction (MILCON), Host Nation programs, Nonappropriated-funded (NAF), Other Procurement, Army (OPA) and maintenance and repair, local minor construction, and self-help. Each improvement project is described and cost-estimated in enough detail to place each project within the appropriate project list or annual work plan, in an appropriate Fiscal Year, within the statutorily correct funding program. Projects require a Capital Investment Strategy.

6.1.2 The paragraphs below discuss each project at length and includes existing conditions, project description, design concept, cost estimate, primary and alternate recommended funding sources, photographs, sketches and maintenance impact as applicable.

6.1.3 Appendix G of this Army Installation Design Guide, the Prioritized Improvement Projects List, records information on each project and prioritizes them in accordance with the installation goals and objectives stated in paragraph 3.2, Goals, Objectives and Recommendations. The appendix is an interactive form and designed to be altered as circumstances effecting the prioritization scheme change.
6.2 **INSTALLATION: INSERT PROJECT TITLE**

**Installation:** Where applicable complete the following with text, photographs, sketches, etc:

6.2.1 Existing Conditions:

6.2.2 Project Description:

6.2.3 Design Concept:

6.2.4 Cost Estimate:

6.2.5 Site Plan:

6.2.6 Maintenance Impact:

6.2.7 Recommended Funding Source:

6.2.8 Alternate Funding Source:

6.3 **PROJECT TITLE, AND CONTINUE THE SAME AS ABOVE**

6.3.1

6.3.2

6.3.3

Cont.

6.4 **PROJECT TITLE, AND CONTINUE THE SAME AS ABOVE**

6.4.1

6.4.2

Cont.
SECTION 7
SITE PLANNING
DESIGN STANDARDS

Installations - Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation to meet Army standards.

7.1 INTRODUCTION

7.1.1 Site Planning is the process of arranging an external physical environment in complete detail to include the structures, circulation patterns, and other elements that form the built environment. The site planning and design process is used to develop a project that fulfills facility requirements and creates the optimal relationship with the natural site. See Unified Facilities Criteria (UFC) 3-210-06FA, Design: Site Planning and Design for detailed guidance on site planning to include program analysis, site analysis, site verification, and concept development. This TM also discusses site design guidelines, describes the steps in the site planning process, and contains examples of various sketches/diagrams developed in support of these steps. Also see TI 800-01, Design Criteria, Chp. 3, Site Planning and Design Criteria. Environmental documentation will be prepared prior to site selection to support the construction activity in accordance AR 200-2, Environmental Effects of Army Actions.

7.1.2 The site planning component provides the spatial arrangement of the installation. (Fig. 7.1) The installation master plan provides information that forms the foundation for site planning. The master plan is a mechanism for ensuring that individual projects are sited to meet overall installation requirements. AR 210-20, Master Planning for Army Installations,
and the **Master Planning Instructions (MPI)**, provide additional information concerning the master plan.

7.1.3 The other five design components are dependent upon site planning for their location and spatial relationships. The other five components are identified below and discussed in Sections 8-12.

- **Section 8 - Buildings Design Standards**
- **Section 9 - Circulation Design Standards**
- **Section 10 - Landscape Design Standards**
- **Section 11 - Site Elements Design Standards**
- **Section 12 - Force Protection Design Standards**

### 7.2 SITE PLANNING OBJECTIVES

7.2.1 The goal of site planning for the installation is to produce an attractive, sustainable development. Sustainability requires the built environment to be designed and constructed to preserve and enhance the natural environment. Manmade facilities are designed as a part of the environment to minimize negative environmental impacts. General site planning techniques resulting in sustainable development are cost efficient because they conserve energy and reduce construction and maintenance cost. Typical site planning objectives include the following.

7.2.1.1 Preserve natural site features such as topography, hydrology, vegetation, and tree cover.

7.2.1.2 Locate facilities with consideration of climatic conditions such as wind, solar orientation, and microclimate.

7.2.1.3 Preserve the natural site by molding development to fill around existing land forms and features. This development approach minimizes extensive earthwork, preserves existing drainage patterns, and preserves existing vegetation.

7.2.1.4 Plan for facilities to be clustered to preserve land and reduce construction cost. Clustering should occur on the flattest land areas. Room for expansion should be provided. When clustering facilities Force Protection measures must be considered.
7.3 SITE PLANNING CONSIDERATIONS

7.3.1 The primary “fit” of the development to its environment is initially determined by the site analysis and subsequent site planning. The determination of primary issues that provide basic location and organization of spatial relationships are determined during the site planning (Fig. 7.X).

**Installations** - Expand or modify entries as necessary for particulars within geographical area or specific objectives of the Region, Command, or installation.

7.3.2 Accessibility. Any building or facility used only by able-bodied personnel need not be accessible to the disabled. Nevertheless, when feasible and appropriate, seek to incorporate accessibility measures into the design since the facility use may change over time (military exclusion is provided by **UFAS 4.1.4 (2)**). All other structures or facilities must meet the standards of the **Americans with Disabilities Act Accessibility Guidelines (ADAAG)** and the **Uniform Federal Accessibility Standards (UFAS)**, with the most stringent standards applied in the event of conflicting guidelines. (See **AR 420-70**, Chapter 2, Para 2.8). This includes the avoidance of site barriers through the use of curb cuts, ramps, handrails, and grade-level entrances to avoid site barriers. Provide designated handicapped parking spaces in all major parking lots and drop-off zones for persons with mobility impairments. Modify existing structures for handicapped accessibility whenever possible, especially community facilities that are most likely to be used by families, veterans or visitors.

7.3.3 Environmental. Environmental issues to consider in the preparation of a site plan include any action or proposal that has a detrimental affect on a site area’s land, water, or air quality. The location of facilities on land that results in minimal disturbance to the existing topography, vegetation, and drainage patterns greatly reduces the negative impact on the environment. It is the Garrison Commanders responsibility to ensure that all National Environmental Policy Act (NEPA) documentation is started before the site selection process, as this process feeds the 1391 process.

7.3.3.1 NEPA requires that an Environmental Impact Statement (EIS) be submitted to the U. S. Environmental Protection Agency (EPA) for major projects that may significantly effect the environment. The EPA reviews and responds to filed impact statements. Information pertaining to Environmental Impact Statements and their submission can be found at the following EPA websites.
7.3.3.2 Federal law requires that prior to the undertaking of activities which effect the nation's waterways, described as "navigable waters of the United States" and "waters of the United States" to include wetlands, a permit must be acquired. Information regarding statutory, administrative, and judicial matters, including general regulatory policy, definitions of "waters of the United States" and "navigable waters", and processing of permits can be obtained at the following Corps of Engineers website.

7.3.3.3 Include procedures for mitigating environmental concerns in the early stages of project development. To the maximum extend possible avoid siting development or individual buildings in environmentally sensitive areas. The installation master plan environmental overlay should be reviewed prior to the development for areas designated as threatened and endangered species habitat areas.

7.4 SITE PLANNING DESIGN CRITERIA

7.4.1 The site planning component of installation design comes first in the design process and determines the general location of the other components. Consequently, site planning must consider the criteria for architectural design, circulation, landscape architecture, site elements, and force protection. Site planning criteria is divided into two categories, natural conditions and manmade conditions. Each is discussed separately in the following paragraphs. These criteria are to be utilized for the assessment of the visual and spatial impacts of site planning.

7.5 NATURAL CONDITIONS

7.5.1 Topography. The natural terrain is a major determinant of the layout and form of the installation. The following guidelines should be used to maintain the natural topography of the installation (Figs. 7.X and 7.X).

*Installations* - *Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation.*
7.5.1.1 Maintain natural ground slopes and elevations.

7.5.1.2 Align roadways and buildings along topographic lines.

7.5.1.3 Locate facilities that have expansive ground coverage on relatively flat terrain.

7.5.1.4 Use moderately sloping areas for buildings with less ground coverage area.

7.5.1.5 Avoid development on steep slopes.

7.5.1.6 Avoid development in natural drainage ways and flood plains.

7.5.1.7 Provide a reasonable balance of cut and fill.

7.5.2 Hydrology. The site planning team will consider the following hydrologic concerns for natural drainage corridors, floodplains, and waterways during the site planning process.

*Installations* - *Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation.*

7.5.2.1 Preserve and maintain natural drainage areas and floodplains.

7.5.2.2 Limit development in floodplains to open spaces and recreation uses.

7.5.2.3 Preserve rivers, lakes, streams, or other waterways, and incorporate them into the design layout.

7.5.3 Climate. The installation will be designed in response to local climatic conditions to provide a more comfortable environment, and reduce the demands for heating and cooling.

*Installations* - *The following general guidelines are for the four (4) most prevalent climatic regions. Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation.*

7.5.3.1 Cool Regions. Design and site development by maximizing the warming effect of solar radiation in winter and reduce the impact of cold winter winds.
7.5.3.2 Temperate Regions. Design and site development to balance the effects of seasonal thermal variations promoting both winter and summer cooling in terms of seasonal solar orientation and prevailing winds.

7.5.3.3 Hot Arid Regions. Design and site development to minimize solar heat gain and maximize shade and encourage humidity in outdoor spaces.

7.5.3.4 Hot Humid Regions. Design and site development to minimize solar heat gain and promote air movement and cross ventilation.

7.5.4 Views and Vistas. The installation will be designed to preserve and enhance scenic and other attractive views and vistas, and to screen unattractive views and vistas. Visual extensions through open spaces provide a sense of orientation, relief, and enjoyment.

Installations - Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation.

7.5.5 Vegetation. The installation will be designed to protect and preserve existing native vegetation. This preservation reduces maintenance and enhances sustainability. A preferred plant matrix (Appendix O, Plant Palette) is included in this Army Installation Design Guide. (Also, see Section 10 – Landscape Design Component).

Installations - Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation.

7.6 MANMADE SITE CONDITIONS

7.6.1 The site plan provides the locations of the manmade development that will occur on site. It establishes the spatial relationships as well as the relationships between manmade and existing natural features. Manmade site conditions include all development on the installation to include buildings, roadways, parking lots, walkways, walls, fences, utilities, and other facilities. Buildings, roadways, parking lots and above ground utilities are the primary manmade visual determinants.

7.6.2 The following site planning guidelines will be used in the visual and spatial review of the installation:

Fig. 7.X - Building oriented for passive solar heating and cooling
7.6.2.1 Cluster buildings to reduce impact on the natural environment, and reduce roadways and utility corridors needed to serve the development, however, at the same time giving full consider to antiterrorism and force protection requirements.

7.6.2.2 Locate large buildings in relatively flat areas to reduce the cut and fill and preserve the natural vegetation and drainage and orient to topography (fig. 7.X).

7.6.2.3 Minimize solar heat gain for cooling and maximize solar heat gain and retention for heating.

7.6.2.4 Site buildings with consideration for the microclimate conditions of the site that result in variances in wind or light because of adjacent land forms, structures, or trees.

7.6.2.5 Orient outdoors pedestrian areas for most comfortable exposure.

7.6.2.6 Utilize lighter colored building surfaces exposed to the sun and darker colors on recessed surfaces to absorb radiation.

7.6.2.7 Orient windows according to impact of climatic conditions.

7.6.2.8 Locate development on leeward side of hills.

7.6.2.9 Design and locate roads to provide a hierarchy of traffic carrying capacities.

7.6.2.10 Locate roads to blend with topography and vegetation.

7.6.2.11 Design and locate parking lots to minimize visual impact of broad expanses of pavement and vehicles.

7.6.2.12 Design and locate pedestrian walkways and bicycle paths to fit the physical environment, and provide a comfortable pedestrian experience, limiting conflicts with vehicular traffic (Fig. 7.X).

7.6.2.13 Locate trees and shrubs to buffer harsh natural conditions.

7.6.2.14 Deciduous material provides for sun in the winter and shade in the summer. Evergreen material provides windbreaks for cold north winds.
7.6.2.15 Design and locate site elements to blend with and enhance the physical environment.

7.6.2.16 Force Protection requirements should be designed and located to blend with the physical environment.

7.7 ARMY STANDARDS

7.7.1 The cited Army Standards shall be met.

- Unified Facilities Criteria (UFC) 3-210-06FA, Design: Site Planning and Design
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)

7.8 REFERENCES

7.8.1 The following references are provided for guidance.

- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chap 7
- Unified Facilities Criteria (UFC) 3-400-01, Design: Energy Conservation
- Unified Facilities Criteria (UFC) 3-210-01A, Design: Area Planning, Site Planning, and Design,
- Unified Facilities Criteria (UFC) 3-230-15FA, Design: Subsurface Drainage Facilities for Airfields and Heliports
- Unified Facilities Criteria (UFC) 3-230-16FA, Design: Drainage and Erosion Control Structures for Airfields and Heliports
- Unified Facilities Criteria (UFC) 3-230-17FA, Design: Drainage for Areas Other than Airfields
- Unified Facilities Criteria (UFC) 3-230-18FA, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas
- Unified Facilities Criteria (UFC) 3-260-02, Design: Pavement Design for Airfields

- Unified Facilities Criteria (UFC) 3-250-01FA, Design: Pavement Design for Roads, Streets, Walks and Open Storage Areas

- Army Regulation (AR) 200-2, Environmental Effects of Army Actions

- Technical Instructions (TI) 800-01, Design Criteria

- Technical Instructions (TI) 801-02, Family Housing

- Master Planning Instructions (MPI)

- Whole Building Design
**8.1 INTRODUCTION**

8.1.1 The design character of an installation's buildings affect the installations overall image. The visual analysis of buildings and related structures helps define visual zones and themes and is an important part of an installation’s assets and liabilities assessment.

8.1.2 The building design component encompasses the character of the buildings as well as the arrangement of buildings to one another and to their environment. In general, use architectural style, materials, and colors indigenous to the region. The preservation of historically and culturally significant structures adds to an installation’s character and provides a sense of heritage.

8.1.3 The visual analysis of structure also includes concern for accessibility, use of materials, placement of entrances, incorporation of additions and renovations, the incorporation of plazas and courtyards, interior design and the appropriateness and quality of building maintenance.

8.1.4 This section provides the objectives and visual determinants that should be utilized to identify and assess the building design quality of the installation. The section also provides standards and guidance pertaining to the development and
maintenance of the various interiors and exteriors of buildings on the installation.

8.2 BUILDING OBJECTIVES

8.2.1 Sustainability. The architectural style of existing and future buildings should reflect and reinforce the sustainability of the installation. Sustainable design reduces construction and maintenance cost and conserves energy through proper construction and materials selection. See Appendix D for a more complete discussion on Sustainable Design.

8.2.2 Building Design Objectives:

8.2.2.1 Adapt building designs to natural site conditions (Fig 8.X).

8.2.2.2 Design buildings in clusters to preserve land and reduce construction and maintenance costs.

8.2.2.3 Develop a coherent architectural style that results in the blending of new and old structures. However, when considering historical buildings one should be able to differentiate between the historic fabric and the new material.

8.2.2.4 Design buildings to include more floors in a vertical structure that results in a smaller footprint and more efficiently utilizes limited installation land areas.

8.2.2.5 Combine multiple activities in one building to reduce the number of buildings required and more efficiently utilize limited installation land areas.

8.2.2.6 Design multiple use facilities with the capability to quickly change interior layouts to accommodate changing requirements.

8.2.2.7 Use indigenous construction materials and practices that require less energy to produce and transport and may be recycled at the end of their usefulness.

8.2.2.8 Locate windows to maximize natural light, ventilation and outward views.

8.2.2.9 Consider adaptive reuse of buildings once their initial use is no longer required.
8.3 STRUCTURAL CHARACTER

8.3.1 The character of installation architecture varies according to the use of the structure and when it was built. This use and age variation can result in character incompatibilities.

8.3.2 The difference in character may also result when the designer ignores the character and scale of adjacent buildings or uses an imitative technique unsuccessfully.

8.3.3 The coordination of structural character on an installation provides a consistent and coherent “sense of order” and “sense of place”. This relationship of design comes from using compatible scales, massing, form, color, texture, materials, and fenestration. These design techniques can be utilized in the visual review and analysis of the installation. They are further explained below:

8.3.3.1 Scale. Scale refers to the size of a building facade in relation to humans. Buildings that include predominant vertical facades, which dwarf the individual, are defined as monumental in scale. Buildings with more horizontal facades designed to relate more to the size of the human figure are defined as human scale (Fig. 8.X). The scale of most buildings on installations should be more human than monumental. All new construction should be compatible in scale with adjacent buildings. Monumental architectural design is typically utilized for more ceremonial buildings, such as worship centers, headquarters complexes, and hotel facilities. These buildings make use of large, glazed areas at entrances and oversized fenestration elements to create a scale appropriate to the building’s use. Scale and relief should be provided through roof form, fenestration, building articulation and landscape plantings.

8.3.3.2 Massing. Massing refers to the overall bulk or volume of a building or buildings (Fig. 8.X). The size and proportion of the individual buildings in a grouping of buildings should be designed to be proportionally compatible with the adjacent structures.

8.3.3.3 Form. The form of a building is determined by its size, mass, shape and proportions. The use of similar building forms provides continuity to the installation architectural impact. The result is a more aesthetically pleasing environment.

8.3.3.4 Color. The use of a color scheme that is consistent throughout the installation, where possible, results in a continuity of buildings and contributes to a sense of place (Fig. 8.X). However, color schemes throughout the installation often vary
according to the visual zone and visual theme in which the structure is located.

8.3.3.5 Texture. The use of materials of similar texture in buildings helps to provide visual continuity for the installation.

8.3.3.6 Materials. The use of the same materials in the exterior finish and trim of buildings helps provide visual continuity.

8.3.3.7 Fenestration. Building fenestration includes features such as doors, windows, and building decoration details. These features should be similar in arrangement, design, size, and proportion for architectural compatibility and visual consistency and continuity (Fig. 8.X).

8.4 BUILDING ENTRANCES

8.4.1 A building entrance is a primary feature of any building design. The entrance should be defined and recognizable as the point of entry regardless of the size or importance of the building (Fig. 8.X).

8.4.2 The entrance to a building should be in a prominent location and should be oriented toward the primary adjacent public spaces such as a courtyard, lawn, parking lot, or street.

8.4.3 The details of an entrance should be designed to provide continuity with other entrances to the building and the entrances of adjacent buildings.

8.5 SERVICE AREAS

8.5.1 Service areas, such as loading docks and trash dumpsters, should be screened from the views of primary use areas such as entrances, courtyards, gathering areas, streets, and parking lots.

8.5.2 Service areas should be screened as an enclosure by using walls and landscaping. Screen walls should be between six and eight feet high and should be in harmony with the adjacent building.

8.5.3 Trash and garbage collection areas must be located a minimum of 25 meters (82 feet) from troop billeting, family housing areas (containing more than 12 units), and stand-alone retail facilities. They will be placed a minimum of 10 meters (33 feet) from all other inhabited structures (UFC 4-010-01, Table B-1).
8.6 BUILDING ACCESSIBILITY

8.6.1 All structures or facilities, other than the exceptions mentioned below, must meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS) accessibility standards. The more stringent standards apply in the event of conflicting guidelines (Fig. 8.X).

8.6.1.1 Any building or facility that is specifically restricted by occupancy classification to use only by able-bodied personnel during the expected useful life of the building or facility need not be accessible (military exclusion is provided by UFAS 4.1.4 [2]), but accessibility is recommended since the intended use of the facility may change with time.

8.6.1.2 In particular, the following facilities need not be designed to be accessible: unaccompanied personnel housing, closed messes, vehicle, and aircraft maintenance facilities.

8.7 SEISMIC POLICY

8.7.1 The minimum performance objective for Army facilities is Substantial Life-Safety. To ensure compliance, seismic evaluations and mitigation of unacceptable seismic risks shall be performed. Higher levels of seismic protection for mission essential facilities will be considered in the evaluation.

8.7.2 Seismic evaluation. Guidance for the seismic evaluation of existing facilities is given in TI 809-05, Seismic Design Evaluation and Rehabilitation for Buildings. Buildings will have a seismic evaluation performed when:

- A change in the building's use causes a change in the occupancy category, as defined in TI 809-04, Seismic Design for Buildings, to a category of greater importance (lower category number).

- A project is planned which causes the capacity of the structural system or components to be reduced to 90 percent or less of original stability and strength.

- A project will significantly extend the facility's useful life or will significantly increase the facility's value and the cost exceeds 50 percent of the current replacement value.
A facility is damaged or is deemed to be an exceptionally high risk to occupants or to the public.

8.7.3 Exceptions to Seismic Evaluations. Existing facilities are exempt from seismic evaluation if:

- The original design was done according to the provisions of the 1982 or later edition of TM 5-809-10, or the 1988 or later edition of TM 5-809-1.
- Replacement is scheduled within 5 years.
- The facility is intended only for minimal human occupancy, and occupied by persons for a total of less than 2 hours a day.
- The facility is a one or two family dwelling, two stories or less, located in zone 1 or 2, as shown in TM 5-809-10.
- The gross area is less than 3000 square feet (275 square meters). Mitigation of unacceptable seismic risks. If the seismic evaluation determines that the facility does not meet Substantial Life-Safety or higher performance standards, as appropriate, unacceptable seismic risks will be mitigated. Rehabilitation will be performed in accordance with TI 809-05.

8.7.4 New Facilities or Additions or Extension of Existing Facilities.

8.7.4.1 New facilities and additions or extension of existing facilities will be designed to provide the level of seismic protection required by TI 809-04.

8.8 INDIGENOUS STRUCTURES

Sustainability in the design and construction of buildings includes incorporating time-proven building designs that are indigenous to the region (Fig. 8.X). Indigenous design elements should be utilized in the design of new buildings.

8.9 HISTORIC ARCHITECTURE

8.9.1 The visual integrity of historic buildings or districts on the installation will be preserved and protected. The Army’s management of historic properties is pursuant to the duties and
responsibilities established by Congress under the National Historic Preservation Act (NHPA). The NHPA also created the National Register of Historic Places as the official listing of the nation’s historic properties considered worthy of preservation. When working with historic properties the Army uses the following three categories:

8.9.1.1 Historic Buildings or Structures. These are significant buildings or structures, which are listed in or eligible for listing in the National Register of Historic Places.

8.9.1.2 Historic District. A distinct group of buildings, structures, or landscapes that possesses significance and are listed in or eligible for listing in the National Register.

8.9.1.3 National Historic Landmarks. Buildings, structures, or landscapes listed in the National Register, but also recognized as nationally significant. National Historic Landmarks can either be listed individually or as a district.

8.9.2 For further guidance use Army Regulation 200-4 and Department of the Army Pamphlet 200-4. Specific requirements and recommendations for the treatment of historic properties are available in the National Park Service’s Secretary of the Interior’s Standards for the Treatment of Historic Properties. A working awareness of historic preservation policies and procedures followed by the Army Corp of Engineers can be found in the Technical Instruction (TI) 800-01, Design criteria, Chp. 16, Preservation of Historic Structures.

8.9.3 See Appendix M, Historic Preservation Guidelines.

8.10 RENOVATIONS AND ADDITIONS

When existing buildings are renovated or additions are constructed, the architectural character of the renovation or addition should be compatible with the architectural character of the existing building and the adjacent buildings (Fig. 8.X). This compatibility includes the use of materials, color, shape, size, scale, and massing in the addition or renovation that blends with the architectural character of the existing structure. However, when renovating or adding to historical buildings one should be able to differentiate between the historic fabric and the new material.
8.11 PLAZAS AND COURTYARDS

Plazas and courtyards can be located as part of the primary entrance to a building, or as an extension of non-primary entrance areas to the outside (Fig. 8.X). Wide, paved entrance plazas need vehicular barriers.

8.12 BUILDING MAINTENANCE

Buildings designed and constructed to incorporate sustainable design criteria should minimize life cycle, energy and maintenance costs through proper selection of forms, materials, and construction details.

8.13 INTERIOR DESIGN

8.13.1 Introduction. Inhabited spaces, that require the selection of furnishings or equipment, should be designed by professional interior designers. Interior design impacts the functioning and productivity of people. People spend the majority of their time inside, working, eating, sleeping, and relaxing. The productivity, comfort, and safety of the personnel living, working, or relaxing in the facilities they inhabit is directly related to the quality of interior design provided within the facility.

8.13.2 Interior design is required on building construction and renovation projects regardless of the funding source. General interior design guidance and interior design guidance for medical facilities and family housing is provided at the following websites.


- Medical Facilities. Interior design guidance for medical facilities is furnished in Unified Facilities Criteria (UFC) 4-510-01, Design: Medical Military Facilities.

- Family Housing. Interior design for family housing will be in accordance with Technical Instruction (TI) 801-02, Family Housing.

8.13.3 Engineering Regulation (ER) 1110-345-122, Engineering and Design, Interior Design, defines projects that require interior design, design requirements and responsibilities of participants, and methods and funding for execution of interior design. For cost estimating see Air Force Interior Design Guides, Chap. 3, Cost Estimating Guide.
8.13.4 Space Planning.

8.13.4.1 Space planning is the basic building block of the facilities program for administration and operational facilities. Army Regulation (AR) 405-70, Utilization of Real Property (Appendix D) provides numerical planning allowances and addresses the quantities for programming space for personnel and equipment.

8.13.4.2 Space planning takes into consideration the following; who will be using a space, how this space will be used, what activities will take place there, and the interaction of other people in the building. Professionally trained interior designers are best at gathering the required information to formulate a space utilization plan.

8.13.4.2.1 Bubble Diagrams. Bubble diagrams show the working relationship of one group to another (Fig 8.X). They do not represent a space plan or floor plan, but the relationship of organizations to one another. The adjacency requirements for individuals, user groups, and support functions to accomplish the product of service provided is analyzed. Bubble diagrams assist in organizing an existing facility as well as a new facility.

8.13.4.2.2 Blocking Diagram. An extension of the bubble diagram is the block diagram. The blocking diagram is made more regular and is for fit inside the proposed floor plan (Fig. 8.X).

8.13.4.2.3 The next step in the process is the development of the actual space plan. The layout of the space plan is detailed to the workstation level.

8.13.5 Electrical and Communications.

8.13.5.1 Electrical. Electrical power supply in the United States is available in a number of configurations, the most common of which are 120/240 volt single-phase three wire, 120/208 volt 3-phase 4-wire, and 277/480 volt 3-phase 4 wire.

8.13.5.1.1 Design standards for interior electrical systems are found in Unified Facilities Criteria (UFC) 3-520-01, Interior Electrical Systems. Compliance with this UFC is mandatory for the design of interior electrical systems. This UFC:

- Establishes criteria for the design of interior electrical systems.
• Establishes system-level design criteria.

• Establishes facility-level criteria for interior electrical systems,

• Provides a starting point for determining the applicable design criteria for a facility.

8.13.5.1.2 Facilities outside the United States must comply with the applicable host nation standards; refer to Technical Manual 5-688, Foreign Voltages and Frequencies Guide, for additional information.

8.13.5.2 Communications. Communications systems handle the transport of telephone and data networks (e.g. video, multi-media, teleconferencing, data transfer, facsimile transmission, and voice conversation).

8.13.5.2.1 The design criteria for interior wiring of communications and information system is found in the Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide. This guide shall be used as the basis for designing both the premises distribution system (inside plant) and the outside plant cable distribution system for all new construction and renovation projects. The Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide is Appendix A of U.S. Army Corps of Engineers engineering technical letter (ETL) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide.

8.13.5.3 Distribution. Distribution of electrical and electronic systems through a building is generally accomplished through branched distribution. A central chase or trunk will run the length or height of the facility, then horizontal distribution systems run from a central connection closet to the end user. This distribution may be overhead or underfoot, in many instances it is a combination of the two (Fig. 8.X).

8.13.6 Color.

8.13.6.1 Color plays an important role in the design of interior environments. Color has a large impact on how we feel and behave in a space. Its quality affects emotions directly and immediately. Successful interior designs harmonize form, space, light, and color.

8.13.6.2 Information on color and light, optical effects, basic color theory, color schemes, and applying color in facilities can be

8.13.7 Acoustics.

8.13.7.1 Acoustics as an environmental variable significantly impacts the human impression of an interior environment. Productivity, speech intelligibility, privacy, safety, positive user attitude and response, and environmental comfort all depend on proper acoustic design. The interior designer is concerned with reducing unwanted noise and preserving desirable sound in a space. Sound can be controlled in the following three ways: eliminate the source, isolate the source, i.e. provide a barrier between the user and the source or mask the offending sound.

8.13.7.2 A discussion of the dynamics and control of acoustics can be found in the Design Guide (DG) 1110-3-122, Design Guide for Interiors, Chap. 5.

8.13.8 Interior Lighting.

8.13.8.1 Lighting will be designed with the work activities being performed in mind. Always supplement overhead lighting with task lighting and use architectural lighting in entrances, corridors, waiting rooms, and other spaces to light artwork and provide interest.

8.13.8.2 For Army installation buildings to achieve a high quality lighting environment, lighting equipment/systems selected must satisfy both performance and aesthetics (Fig 8.X). Factors for consideration in this selection are based on the following: lumens per watt, color temperature, color rendering index, life and lumen maintenance, availability, switching, dimming capability, and cost.

8.13.8.3 Lighting design approaches and lighting applications can be found in the following publications:

- Technical Instructions (TI) 811-16, Lighting Design; Design Guide for Interiors, DG 1110-3-122 Chp. 5
- Air Force Interior Design Guides, Chp. 10
- Unified Facilities Criteria (UFC) 3-520-01, Interior Electrical Systems, Appendix F.
8.13.8.4 Lighting Maintenance, Types, and Problem Solving. Information on lighting maintenance, types, and lamp troubleshooting is found in **TM 5-683, Electrical Interior Facilities, Chp. 9**.

8.13.9 Finishes. Interior finish standardization is important for administrative and financial reasons. Standardization presents a unifying element throughout all buildings that is more cost effective, efficient, and easy to maintain.

8.13.10 Installation Finishes Standards. Installation finishes standards are found in **Appendix I, Interior Finishes Standards** of this guide.

**Installations** - Expand paragraph as required and develop **Appendix I, Interior Finishes Standards**, showing interior finish color schemes and interior finish specifications for particular areas of the installation, i.e. Administrative, Barracks, Community Support, Recreation Facilities, Industrial etc.

**Note:** Interior finishes include flooring (carpet, tile, resilient flooring, recessed walk off mats, concrete), walls (wall base, paint, vinyl wall covering, ceramic tile), counter and surface material (restrooms, cabinetry), doors, ceilings, and lighting. Include pictures where possible and cross-reference materials to a "Finish Materials Listing for Products Specifications".

8.13.11 Furnishings. Furnishings are elements added to a building for utility or ornamentation following construction. These include furniture such as chairs, desks, sofas, and tables and also cabinetry, window treatments, signage, accessories, art, and plants (Fig. 8.X). When selecting furnishings for an interior environment, care should be taken to include their design as an integral part of the overall concept and to ensure coherency between architecture, materials, furniture, art, and signage. The following paragraphs discuss the various furnishings components and give guidance on the programming, acquisition, functionality, and maintenance of the various components.

8.13.11.1 Furniture. Furniture systems are a wide range of furniture types comprised of components to create a custom designed work environment to meet specific functional needs. Furniture includes seating and case goods. Case goods are furniture elements constructed from box-like components. These include desks credenzas, file cabinets, etc. Case goods fall under two major categories: conventional and modular. Conventional case goods are delivered as pre-assembled, ready-to-use products.
Modular case goods are manufactured as separate pieces that may be grouped into a number of different arrangements.

8.13.11.1.1 Systems Furniture. Systems furniture is ergonomically designed to meet a variety of conditions and requirements. Careful planning is critical during the initial stages of designing new systems furniture layouts. Power and communications requirements must be determined and planned so they are available at the locations where they are needed. Provisions for furniture systems electrical and data requirements must be made a part of the construction documents. See paragraphs 8.13.5.1.1 and 8.13.5.2.1 for interior design standards for electrical and communications wiring respectively. Surface mounted conduit and power poles are unsightly and should be avoided.

8.13.11.1.2 For a detailed discussion on the Army Interior Design Process (planning and programming, procurement, and design services) and Planning for Administrative Work Environments (data collection, analysis, space planning, layout, design coordination, documentation, and implementation) see Appendix A and Appendix B of Design Guide for Interiors, DG 110-3-122 respectively.

8.13.11.1.3 Budgeting for Furniture Systems. Furniture systems represent a significant percentage of a project. Furniture systems are O&M funded and should be included in the project scope along with such items as built-in casework. Furniture systems are listed on the DD Form 1391 as a non-add entry in Block 9 for "Equipment Provided for Other Appropriations". In Block 12b, the furniture systems should be as an O&M funded item, the fiscal year the funds are requested, and the line item cost. Accessories can amount for a significant portion of the furniture systems package and should be budgeted with the basic system components.

8.13.11.1.4 Systems Furniture Design Guidelines.

8.13.11.1.4.1 General.

- During the initial planning of new systems furniture, consider the condition and appearance of existing paint, wall coverings, carpet, and base of the area.

- When planning the location of office equipment and break areas, do not place heat generating devices, such as coffee makers or copiers, near a thermostat.
• Circulation paths should be clear and easy to navigate.

• Topics that should be considered when designing new systems furniture layouts include:
  o Function of the office
  o Adjacencies of personnel and activities
  o Meeting and conference room requirements
  o Individual storage needs
  o Areas for common use office equipment such as the copier and fax
  o Reception area with waiting and guest seating space
  o Special furniture or needs of a particular office, such as drafting tables or extra storage space
  o Communications equipment
  o Task lighting, daylight, and ambient lighting
  o Special security requirements
  o Budget constraints
  o Flexibility to allow future changes
  o Schedules of design, delivery, and installation
  o Air conditioning
  o Acoustic performance requirements

8.13.11.1.4.2 Panels.

• Full height panels should be used only in areas with a specific need for increased privacy or separation, such as conference rooms, break areas, and certain private offices.

• Provide glass panels in corners and at windows to open up the space and allow natural light to filter into the center of the space.
• Provide access panels in the systems furniture to allow for communications connection.

• Panels should generally not exceed 66 inches in height in an open office area. Taller panels cut off air circulation, block views and natural light, and create a closed-in feeling.

• The location and use of taller panels must be carefully planned and coordinated because they can interfere with the proper functioning of air conditioning diffusers, fire sprinklers and smoke detectors, lighting fixtures, switches, thermostats, and sensors.

• Panels should not block service access to mechanical, electrical, or telephone equipment.

• Do not install panels in front of windows, as they will block natural light for the entire area. Panels installed perpendicular to windows should be installed at a window mullion.

8.13.11.1.4.3 Color and Texture.

• To maintain a professional atmosphere, the style and types of systems furniture should be consistent throughout the area.

• The materials and colors of the panels and chairs should be durable. They should be heavy-duty and stain resistant.

• The fabric on the systems furniture panels should harmonize with the overall building color scheme.

8.13.11.2 Window Treatments.

8.13.11.2.1 Window treatments serve many purposes in an interior environment. They provide privacy, light and sun control, reduced energy consumption, and decreased sound transmission. The type of treatment, as well as the type of material used, will determine the effective of the treatment in and give instance. The following should be taken into consideration when selecting fabric type:

• Sheer or semi-sheer fabrics will provide minimum privacy, shade, and energy conservation.
• Heavy, opaque fabric and hard treatments should be used only where total light exclusion is required.

• Full, soft treatments will absorb more sound than hard treatments.

8.13.11.2.2 Window treatments should complement and support the interior design of a space (Fig. 8.X). Window treatments also conceal architectural defects, or change the apparent size, shape, and character of a room. Consider the following factors when making a window treatment selection:

• Light control requirements

• Architectural style

• Historical context

8.13.11.3 Signage.

8.13.11.3.1 Signage may be informational, directional, or regulatory. Informational signage provides the user with information and includes room or area labels, bulletin boards, menus, artwork descriptions, and emergency information. Directional signage directs circulation and provides orientation. It includes entry directories, directional arrows, and maps. The purpose of regulatory signage is control: providing prohibitions, warnings, emergency instructions, and use restrictions (Fig. 8.X).

8.13.11.3.2 Interior signage is covered in detail in Technical Manual (TM) 5-807-10, Signage. The manual includes graphics for the following: directional, identification signs, information, and pictograms.

8.13.11.4 Accessories.

8.13.11.4.1 Accessories may be either functional or decorative. Whatever the purpose, accessories serve to make a room appear inviting and personal.

8.13.11.4.2 Functional Accessories. These accessories include letter trays, coat racks, lamps, product displays, magazine racks, brochure racks, and message boards. This group of accessories should be selected for utilitarian aspects as well as aesthetic qualities that may contribute to the total design concept. Repetitive elements can act as unifiers and help tie the accessories to the design theme.
8.13.11.4.3 Decorative Accessories. Decorative accessories are objects such as artwork and plants.

8.13.11.5 Art. The preparation of artwork to be displayed and positioned in an interior space involves many important decisions. The designer must work closely with the user to determine placements that are satisfactory for both functional and visual composition. Some of the factors to be taken into consideration in the selection of are:

- Quality (posters, prints, original art),
- Subject matter,
- Medium (photography, paper, oil, etc.),
- Size,
- Placement,
- Method of display (permanent collection or rotating program),
- Lighting, and
- Integration with design scheme.

8.13.11.6 Plants.

8.13.11.6.1 Plants add color, texture, and variety of form and shape to the interior. They bring a natural element to an interior space. They are used for focal points, screen, and for psychological effect. Increasingly, plants are being incorporated into the interior environment for the health and well-being of the user, as well as enrichment of the space.

8.13.11.6.2 When selecting plants, their light, water, and temperature needs, continuing care requirements, and ease of replacement must all be considered. Also, the types and amount of light the space has (direct or indirect) daylight, fluorescent, or incandescent must be considered. Plants should not be positioned such that their location presents a problem when watering.

8.13.11.6.3 Detailed information on interior planting to include design considerations (light requirements, temperature, atmosphere considerations, and planters), plant maintenance, and a listing of
recommended plants can be found at the following web locations (Air Force Interior Design Guides, Chapter 8):

- Design Considerations
- Maintenance
- Recommended Plant List


8.13.13 Installation Furnishings Standards. Installation furnishings standards are found in Appendix J, Interior Furnishings Standards of this guide.

Installations - Expand paragraph as required and develop Appendix J showing guidelines for each of the furnishing components (furniture (chairs, desk, sofas, tables, and cabinetry), window treatments, signage, accessories, art, and plants) for particular areas of the installation, i.e. Administrative, Barracks, Community Support, Recreation Facilities, Industrial etc.

8.13.14 Interior Operations Policies. To preserve the quality of facilities, operations policy is set between the user and the installation management. The user is responsible for preserving the visual appearance of the facility, and installation management is responsible for providing maintenance needed to preserve facility quality. Interior operations policies address the following issues (See Appendix N, Housekeeping Rules (Example)):

- Housekeeping responsibilities.
- Policy to prevent and eliminate visual clutter.
- Carpet cleaning, repair, and replacement policy.
- Height restrictions for partitions and furniture.
- Policy on buildings modifications including: partitions, painting, window treatment, HVAC, lighting, and the installation of communications and electric wiring.
- Maintenance of directories and signage.
• Smoking and eating locations.

• Procurement information on matching or compatible furniture.

• Policy on personalization and plants.

8.13.15 Interior Appearance Policy. The following are Army standards to follow. **Installations:** Expand paragraph as required.

• Keep work areas cleared of clutter. Cleanup, throw away.

• Avoid hanging things in the work area. Find another way to refer to organization charts, personnel listings, and calendars, other than having them hung on walls or partitions except framed artwork, diplomas, awards, etc.

• Notes and references hung on partition walls should be kept below the height of the partitions. Some things may be mounted on the partitions by hooking into the metal supports between the partitions, but not by hooking into the fabric.

• Anything not contributing to the overall décor of the work area should be put in a drawer or on a shelf behind a closed door.

• Do not overwhelm the work area décor with an excess of plants or personal artifacts.

• Thin out your files.

• Keep walkways into work areas open and free of clutter. Do not store things on the floor, or on top of shelves, or partitions.

• Office chiefs should consider the overall office appearance and visual contrasts between work areas.

• Be sure that anything you do in your work area contributes to color coordination, rather than detracts from it.
Keep vacant workstations and common areas clean. Do not use them as a dumping area for things you do not know what to do with.

8.14 EXTERIOR BUILDING MATERIALS AND COLOR


8.14.1.1 Building materials make a major contribution to the scale, color, texture, and character of a military installation. A limited palette of durable, low maintenance materials should be used that, while encouraging a variety of expression, provides a cohesive and consistent architectural character through the installation and within each visual zone. Material should reflect the function of a building, and its hierarchy within the installation.

8.14.1.2 Use the following guidelines when selecting exterior building materials.

8.14.1.2.1 Choose materials for their longevity and maintenance characteristics.

8.14.1.2.2 Use materials with integral colors - avoid painting exterior colors.

8.14.1.2.3 Use installation standard colors for exterior walls. Add accent colors sparingly. Accent colors can be used in recesses and to accent certain portions of a building façade.

8.14.1.2.4 Use pre-finished material where possible - gutters, window frames, doorframes, etc.

8.14.1.2.5 Use blended colors on pitched roofs.

8.14.2 Appendix K, Exterior Materials Charts list the building materials applicable to the visual zones listed in the following paragraphs:

Installation: Duplicate the Exterior Materials Chart page as many times as necessary to have an exterior building materials file for each visual zone.

8.14.2.1 Example, Family Housing Visual Zone

Installation: List each of your visual zones and link to Appendix K.

8.14.2.2 Example, Community Support Visual Zone, Etc.
8.14.2.3 **Installation:** Keep adding visual zones as applicable.


8.14.3.1 Color charts have been developed for specific geographical areas giving consideration to climate, geography, culture, facility function, historical context, architectural character, etc. Color changes will be implemented during normally scheduled paint cycles (see Appendix L, Exterior Color Charts).

8.14.3.2 Color is closely linked to the appropriate selection of exterior building materials and is a critical design element in relating adjacent buildings and creating a compatible visual environment within an installation.

8.14.3.3 Historic Buildings. Repaint the building or structure to match the existing colors or colors that can be documented to have been used on that building.

**8.15 KEY FACILITY TYPES STANDARDIZATION**

8.15.1 The Assistant Chief of Staff for Installation Management (ACSIM) establishes Army facility standards and approves deviations from the standards.

8.15.2 Residential Communities Initiative.

8.15.2.1 The intent of the Residential Communities Initiative (RCI) is to improve the housing for military families by providing quality housing that is built in attractive neighborhoods.

8.15.2.2 The Military Housing Privatization Initiative (MHPI) legislation allows developers to build housing to local standards. In those areas where local standards do not meet the quality of life requirements of soldiers, the Community Development and Management Plan (CDMP) process allows a negotiated determination of those standards. To ensure a uniform level of quality throughout RCI, Headquarters, Department of the Army has developed a "Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing" to be used as reference points during CDMP preparation.

8.15.2.3 All RCI projects planned or under design will meet the "Gold" SPiRiT rating (as of 18 March 2003). See Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.

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Fig.8.X - The Geographical Areas for Exterior Colors
8.15.3 Department of the Army (DA), Facilities Standardization Program.

8.15.3.1 Under the DA Facilities Standardization program, standard design packages are developed for facility types that are repetitively designed and constructed at Army installations. These design packages are developed to the definitive design level (10%-15%) and once approved are mandatory for Army MILCON.

8.15.3.2 Currently, there are thirty one (31) DA standard design packages. Headquarters, U.S. Army Corps of Engineers has established eight (8) Centers of Standardization to develop and maintain the definitive and design packages. See Appendix P, DA Facilities Standardization Program Centers of Standardization for a list of the various centers and the facility type assigned to each center. (Centers of Standardization homepage.)


8.15.4 Unaccompanied Personnel Housing (Army Barracks Modernization Program).

8.15.4.1 The Army's Barracks Modernization Program is based upon a whole community approach providing modernized private living and sleeping areas for soldiers as well as a more functional work environment. This is being realized with the construction and renovation of barracks, and associated Company Operations Facilities (COF), Battalion Headquarters (BN HQ) and Brigade Headquarters BDE HQ), and Dining Facilities (DEFAC). For a detailed discussion of the Army Barracks Modernization Program see the Army Barracks Master Plan. The Army Barracks Master Plan only includes requirements for activity duty permanent party soldiers' barracks.

8.15.4.2 Army Barracks Standards. The Army Barracks Modernization Program design criteria gives commanders and contractors the direction to incorporate best business practices around a modular floor plan. The Army Barracks Master Plan, Appendix I, Army Barracks Standards, promotes barracks with an appropriate balance between private and common areas. The Vice Chief of Staff of the Army (VCSA) specified the “New Army Barracks Construction Criteria” in his Memorandum Subject: New Barracks Construction Criteria, dated 11 July 2002 in which he strongly endorsed the new standards. The criteria was further
revised in Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003 which makes the following four changes to the Army Barracks Standards:

- Establishes the two-bedroom/one bath module as the standard module;
- Requires installation of a stove or cook top;
- Requires laundries in the barracks; and
- Eliminates the separate soldier community building.

See the above memorandum for detailed guidance.

8.15.4.3 Furnishings.

8.15.4.3.1 Acquisition of new furnishings is planned and accomplished in concert with the facility design and construction schedule so that delivery of the new furnishings coincides with the beneficial occupancy date (BOD).

8.15.4.3.2 The U.S. Army Interior Design Manual (IDM) for Single Soldiers provides guidance to help furniture managers prepare order packages. The manual uses standard Army furniture specifications; i.e. medium oak wood furnishings or acceptable wood/steel alternatives; construction and fabric specification, and specific information for authorized items of furniture. The manual also contains standard living/sleeping room arrangements, and SCB plans with color schemes. The manual includes information on waiver requirements, the procurement process, order forms, and final inspection checklist.

8.15.4.4 Construction design criteria for COFs, BBN HQ buildings, BDE buildings, and DEFAC facilities can be viewed on the web at ProjNet.

8.15.5 Army Lodging.

8.15.5.1 The Army Lodging Standards promote economies in serving the Army traveler, but not at the expense of quality or service. The standards define the facilities and the level of service the Army traveler should expect.

8.15.5.2 The following standards provide the level of service that a guest should expect when they travel to an Army installation. That expected level of service should be consistent
from installation to installation. The following documents provide the service, operations, and facilities standards for Army Lodging.

- Army Lodging Standards for Service
- Army Lodging Standards for Operations
- Army Lodging Standards for Facilities

8.15.6 Morale, Welfare, and Recreation (MWR) Branded Theme Operations.

8.15.6.1 The U.S. Army Community and Family Support Center (CFSC) through its Theme Operations, offers comprehensive theme packages pertaining to restaurants and entertainment centers. The packages are customized to the installation.

8.15.6.2 CFSC will conduct an assessment for market viability, provide architectural designs, and other promotional items. Information on the CFSC Branded Theme Operations to include how to get a theme operation, management support, and food service support is located on the CFSC website at the Army Brand Theme Operations Home Page.

8.15.7 Range Standards.

8.15.7.1 The Army Sustainable Range Program (SRP), proponent is HQDA Office Deputy Chief of Staff Operations, ODCSOPS/G3 (DAMO-TRS), phone number (703) 692-6410. To contact SRP technical support call (256) 895-1535 or e-mail RTPL@HND01.usace.army.mil.

8.15.7.2 The SRP develops and manages standard designs for Army Ranges in accordance with AR 210-21 and Training Circular 25-8 Army Training Ranges. The Range Standards are available on the following web pages.

- Revised Range Design/Construction Interface Standards.
8.16 PHYSICAL SECURITY REQUIREMENTS

To assure the required physical measures are met the installation Provost Marshall or Physical Security Officer will be coordinated with during the planning, design, and construction of all construction projects. (AR 190-13, The Army Physical Security Program, Para 1-26) See Section 12, Force Protection for a more detailed discussion regarding Antiterrorism measures.

8.17 SALE AND OUTLEASE OF ARMY ASSETS

8.17.1 In an effort to offset some of the impacts of constrained resources, the Army has implemented initiatives that improve cost effectiveness and efficiency of installation operations. To the extent permitted by law, funds that become available as a result of these initiatives are retained by, or returned to, garrison commanders.

8.17.2 The Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA (FM&C)) has developed the "Sales and Outlease of Army Assets - Installation Guide" to assist garrison commanders in using the sales and outlease program. The guide provides an overview of major policies, procedures, and responsibilities pertaining to the following three major initiatives of the program:

- Sale of Real Property;
- Outlease of Real Property; and
- Outlease of Personal Property.

The guide provides hyperlinks to Sale and Outlease governing regulations and legal and informational references.

8.18 ARMY STANDARDS

8.18.1 The cited Army Standards shall be met.

- Army Regulation (AR) 420-70, Buildings and Structures
- Unified Facilities Criteria (UFC) 3-520-01, Interior Electrical Systems
- Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings
• Americans with Disabilities Act Accessibility Guidelines (ADAAG)
• Uniform Federal Accessibility Standards (UFAS)
• Secretary of the Interior's Standards for the Treatment of Historic Properties
• U.S. Army Corps of Engineers Engineering Technical Letter (ETL) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide
• Standards of Seismic Safety for Existing Federally Owned and Leased Buildings
• Army Barracks Master Plan, Appendix I, Army Barracks Standards
• Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003
• Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing
• Army Lodging Standards
• Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHNC 1110-1-23 Manual
• Revised Range Design/Construction Interface Standards

8.19 REFERENCES

8.19.1 The following references are provide for guidance.

• Army Regulation (AR) 190-13, The Army Physical Security Program
• Army Regulation (AR) 200-1, Environmental Protection and Enhancement
- Army Regulation (AR) 200-2, *Environmental Effects of Army Actions*
- Army Regulation (AR) 200-4, *Cultural Resources Management*
- Army Regulation (AR) 405-45, *Real Property Inventory Management*
- Army Regulation (AR) 405-70, *Utilization of Real Property*
- Unified Facilities Criteria (UFC) 2-600-01, *Installation Design, Chap 8*
- Unified Facilities Criteria (UFC) 1-200-01, *Design: General Building Requirements, 31 July 2002*
- Unified Facilities Criteria (UFC) 4-510-01, *Design: Medical Military Facilities*
- Unified Facilities Criteria (UFC) 3-400-01, *Design: Energy Conservation*
- Engineering Regulation (ER) 1110-345-122, *Engineering and Design, Interior Design*
- Department of the Army Pamphlet (DA PAM) 200-4, *Cultural Resources Management*
- Department of Defense (DoD) Interior Design Website
- Technical Instructions (TI) 800-01, *Design Criteria*
- Technical Instructions (TI) 809-04, *Seismic Design for Buildings*
- Technical Instructions (TI) 809-05, *Seismic Design Evaluation and Rehabilitation for Buildings*
- Technical Instructions (TI) 811-16, *Lighting Design*
- Technical Manual (TM) 5-683, *Electrical Interior Facilities*
• **Technical Manual (TM) 5-688, *Foreign Voltage and Frequencies Guide***


• **Army Barracks Master Plan***

• **Air Force Sustainable Facilities Guide***

• **Air Force Interior Design Guides***

• Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA (FM&C))  **Sales and Outlease of Army Assets - Installation Guide***

• **Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website***

• **U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website***


• **Whole Building Design Guide***

• **Unified Facilities Guide Specifications (UFGS), "Division 12 - Furnishings", Construction Criteria Base***

• **Engineering and Construction Bulletins***
9.1 INTRODUCTION

9.1.1 The image of the installation is greatly determined by the design and location of roadways, walkways, entrances, and parking lots. The primary roadway system and parking lots utilize considerable amounts of land and are a visually dominant element of any installation. The location of primary circulation elements is presented in Section 7, Site Planning. This section discusses the details of circulation design and impacts.

9.1.2 The circulation system provides a primary vantage point from which all installations are viewed. Safe and efficient vehicular movement results in better orientation and contributes to the development of a positive environment for installation personnel and visitors. The circulation component is used to assess the circulation elements of the installation and identify specific characteristics that provide visual zone and theme identity.

9.1.3 Roadways, pedestrian walkways, and bicycle trails will be designed to provide a hierarchy of circulation design and carrying capacity. Functionally, a hierarchical network can be created that separates incompatible types of traffic. This separation of traffic promotes sustainability because it results in more efficient energy consumption.
9.1.4 Visually, the circulation hierarchy can be reinforced through design, planting, signage, and lighting to promote a more attractive visual experience and promote a sense of orientation.

9.2 CIRCULATION OBJECTIVES

The goal for the circulation system on the installation is to establish a sustainable system that promotes aesthetic appeal, environmental preservation, and energy conservation while providing safe and efficient circulation. The objectives below should be followed to achieve a sustainable circulation system:

- Provide circulation that meets antiterrorism and security requirements and promotes and enhances public health and safety.
- Provide a system of circulation that includes all forms of vehicular and pedestrian circulation (Fig. 9.X).
- Provide a system that includes hierarchies of vehicular and pedestrian traffic flow (Fig. 9.X).
- Adapt the circulation system to the natural conditions of the site (Fig. 9.X).
- Improve the existing circulation network for expansion, safety, way finding and appearance.
- Promote maintenance and repair of existing and proposed circulation systems.

9.3 ROADWAY HIERARCHY

9.3.1 The roadway network of the installation should functionally and visually reflect a logical hierarchy of traffic circulation. The network should separate types of traffic by function and volume, ranging from through traffic to local traffic. The visual character of each segment of the network should appropriately convey its role and function within the overall network. The basic network is classified as follows in terms of the type, character, and appearance of the road (Fig. 9.X).

9.3.1.1 **Highways.** Highways provide primary high-speed traffic access to, around, or through a military installation. The design includes:
9.3.1.1 Continuous, relatively straight or large radii curvilinear alignments that carry high-speed through-traffic movement between major activity centers within a region.

9.3.1.2 A minimum of two lanes on each direction typically divided by a median or median divider.

9.3.1.3 Alignments that border lane use areas rather than bisect them, and green space buffers between the road and adjacent uses.

9.3.1.4 Controlled access onto the road.

9.3.1.5 Either grade-separated or at grade channelized intersections with traffic signal controls.

9.3.1.6 Shoulders for emergency stopping but strict prohibition of on-street parking.

9.3.1.7 Street signing, lighting, and planting that reflects the high-speed nature of traffic movement.

9.3.1.2 **Primary Roadways.** These are arterial routes that connect major activity centers, provide the primary access through the installation, and provide the means by which most people view the installation (Fig. 9.X). These roadways often traverse the entire installation and carry the heaviest volume of traffic that results in high speed and high visibility corridors. Direct access to this type of road should be restricted to crossing at major intersections. Primary roadways are designated as boulevards in urban areas and as avenues in rural and suburban areas (Fig. 9.X). Design characters include:

9.3.1.2.1 Continuous, through-traffic alignments that are relatively straight or large-radii curvilinear to handle moderate to heavy traffic.

9.3.1.2.2 Alignments that form the boundary between different land uses are preferable to alignments that transect a land use zone.

9.3.1.2.3 Two or more moving lanes in each direction typically divided by a median.

9.3.1.2.4 Controlled access and a minimum of curb cuts limited to entranceways to major facilities or building groups.

9.3.1.2.5 At-grade intersections with signal controls.

9.3.1.2.6 On-street parking prohibited.
9.3.1.2.7 Medians, street lighting, signing, and planting that enforces the moderate- to-high speed nature and importance of the road.

9.3.1.2.8 Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acres.

9.3.1.3 **Secondary Roadways.** Secondary roadways serve as connectors between primary roads and tertiary roads and typically connect primary roads to adjacent land use zones (Fig. 9.X). Secondary roads accommodate moderate to slow traffic speeds with one moving lane in each direction. On-street parking should be prohibited and left-turn lanes provided at intersections with primary roads. Design characteristics include:

9.3.1.3.1 Continuous through-traffic alignment between primary roads, either straight or curvilinear based upon the design speed topography and land pattern.

9.3.1.3.2 Direct access to abutting property.

9.3.1.3.3 A maximum of two moving traffic lanes in each direction, either undivided or a boulevard with planted median.

9.3.1.3.4 On-street parking generally prohibited.

9.3.1.3.5 Sidewalk separated from the road by a planting strip.

9.3.1.3.6 Street lighting, signing, and planting that reflects the moderate-to-slow speed nature of traffic and the character of the land use area they are in.

9.3.1.3.7 Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acres.

9.3.1.4 **Tertiary Roadways.** Tertiary roadways provide access to individual facilities, parking and service areas. They are designed to handle low speed, low volumes of traffic, with one lane in each direction. Tertiary roadways make use of “T” intersections and cul-de-sacs to reduce through traffic, promote safety, and limit noise impacts from truck traffic. Design characteristics include:

9.3.1.4.1 Alignments designed to discourage through-traffic.
9.3.1.4.2 Alignments are relatively short straight or curvilinear keeping with topography, land use, and slow speed nature of traffic.

9.3.1.4.3 Generally a maximum of two moving traffic lanes, one in each direction.

9.3.1.4.4 On-street parking allowable on an infrequent overflow basis by the addition of a parallel parking lane or bay.

9.3.1.4.5 Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acres.

9.3.1.4.6 Sidewalks maybe limited to only side, depending upon need.

9.3.1.4.7 Street lighting, signing, and planting in character with slow speed nature of traffic and the land use area within which the road is located.

9.3.1.5 **Cul-de-sacs.** Cul-de-sacs are short dead-end tertiary streets located primarily in residential areas (Fig. 9.X). They connect at one end to a tertiary or secondary street and have a turnaround at the other end, providing direct access to a abutting property while preventing through traffic. Design characters include:

9.3.1.5.1 Short, straight, or curvilinear alignment to serve abutting property (Fig. 9.X).

9.3.1.5.2 Generally a maximum of two traffic lanes, one in each direction.

9.3.1.5.3 Generally a maximum length of 600 feet, or less, except in areas where terrain and low density justify a longer length.

9.3.1.5.4 Turnarounds must include a diameter to accommodate fire and garbage trucks.

9.3.1.5.5 Turnarounds can be either symmetrical or offset.

9.3.1.5.6 Turnarounds should have center planting islands to reduce the expanse of paved area.

9.3.1.5.7 Overflow parking can be provided on street in parking bays or within center of turnarounds.
9.3.1.5.8 Sidewalks, if any, are generally limited to one side of the road.

9.3.1.5.9 Street lighting, signing, and planting is character with the slow speed nature of traffic and the land use area being served.

9.3.1.6 Tactical vehicle trails provide alternative access for armored vehicles and other vehicles utilized in combat readiness training. They are recommended for installations with high use of armored vehicles to enhance the movement of the vehicles and reduce traffic congestion on the other installation roadways. These trails provide one lane access for vehicles between motor pools and maneuver areas. It is recommended that these trails be hard surfaced within developed areas with concrete of a thickness to withstand the weight of armored vehicles. The hard service will reduce dust pollution. These trails should be designed to provide as direct access as possible while minimizing crossings with primary, secondary, or tertiary roads. All crossings with the other roadway systems should be paved with concrete to support the weight of the vehicles and clearly marked with signage.

9.4 ROADWAY SETBACKS

Department of Defense Antiterrorism standards state that all inhabited buildings within a controlled perimeter will be setback a minimum of 10 meters (33 feet) from roadways, and that troop billeting and primary gathering spaces shall be setback a minimum of 25 meters (82 feet) from roadways. Inhabited buildings not within a controlled perimeter the minimum setback distance is 25 meters (82 feet) and for primary gathering places and troop facilities the minimum distance is 45 meters (148 feet). (See, Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, Table B-1).

9.5 ROADWAY SYSTEM DESIGN

9.5.1 The location and design of new circulation system alignments as well as improvements to the existing system should be prepared to promote development sustainability. They should be designed to minimize impacts, relieve driver monotony, and provide a positive visual experience for the user, without compromising safety (Fig. 9.X). The following design techniques should be applied to circulation system design.

9.5.2 Blend Circulation With Natural Landform. The horizontal and vertical alignment of roads, walkways, and bikeways should
minimize landform disturbance and blend with the natural setting (Fig. 9.X).

9.5.2.1 Minimize cut and fill by avoiding steeping terrain and aligning roadway, walkway, or bicycle system to cross slopes diagonally or parallel to the contours rather than perpendicular to the contours.

9.5.2.2 Mold cut and fill slopes to blend into the natural landform (Fig. 9.X).

9.5.2.3 Blend road drainage ditches, swales, or channels into the natural landform.

9.5.2.4 Use cluster development wherever possible to limit the lengths and required intersections of roadway and other circulation system elements and to preserve land. Consideration should be given to meeting antiterrorism requirements when developing cluster type facilities.

9.5.2.5 Minimize pedestrian, railroad, and bikeway crossings of highway, primary, and secondary roads.

9.5.2.6 Use natural topographic conditions to create grade separated pedestrian, railroad, and bikeway road crossings wherever possible especially on highways and primary roads.

9.5.3 Adapt Circulation to Preserve Vegetation. Design roads, walkways, and bike paths to minimize disturbance to existing vegetation, encourage re-vegetation in disturbed areas, and reduce the visual impact of landscape disturbance (Fig. 9.X).

9.5.3.1 Align roads through open areas rather than forested areas.

9.5.3.2 Minimize cut and fill to reduce the limits of clearing.

9.5.3.3 Clear only for sight distances rather that uniform right-of-way clearing.

9.5.3.4 Utilize tree wells or retaining walls to preserve specimen trees or significant vegetation areas.

9.5.3.5 Provide optimum conditions for re-vegetation by following proper planting and maintenance techniques.

9.5.3.6 Restore vegetation to disturbed areas using naturalistic plantings of native plant material.
9.5.4 Minimize Adverse Impacts on Adjacent Land Uses.

9.5.4.1 Air Pollution. Locate roadway alignments to minimize the impact of traffic-emitted pollutants on adjacent development. This can be accomplished by the following:

9.5.4.1.1 Locate roads adjacent to land uses that are minimally affected by traffic-emitted air pollutants.

9.5.4.1.2 Reduce the impact of traffic-emitted pollutants on more sensitive land use areas by locating the roadways downwind and/or providing planted buffers. Tactical vehicle trails should be hard surfaced to reduce dust pollution.

9.5.4.2 Noise Pollution. Design and locate roadways to reduce the impact of traffic noise on adjacent development.

9.5.4.2.1 Roads should be physically separated from sensitive land uses including residential, medical, education, recreation, administration, religious, library, community, or child care facilities.

9.5.4.2.2 Utilizing noise abatement techniques such as berms, sound barrier walls, and plant material to reduce noise levels.

9.5.4.2.3 Reroute truck and tank traffic to roadways adjacent to less noise sensitive land uses. Tracked vehicle traffic should, ideally, be routed to a system of tank trails that are totally separate from corridors used by wheeled traffic vehicles.

9.6 INTERSECTIONS

9.6.1 Intersections are the most dangerous areas of the installation circulation system. They should be planned or improved to provide safe and efficient traffic flow for both pedestrian and vehicular traffic. The following design techniques should be used to plan or improve intersections (Fig. 9.X):

9.6.1.1 All roadways should intersect at right angles (90 degrees), although 85-95 degrees is acceptable.

9.6.1.2 Avoid dangerous, complex intersections of more than two streets intersecting at one point or offset intersections.

9.6.1.3 Eliminate intersections that are in close proximity to one another. They should be no closer than a minimum distance of 30 meters (100 feet).

Fig. 9.X – Intersection Design
9.6.1.4 Use T-intersections for tertiary road intersections with secondary or primary roads to reduce conflict and promote safety.

9.6.1.5 Provide turning lanes at all intersections along primary roads to eliminate interference with through traffic flow.

9.6.1.6 Minimize intersections along primary roads to reduce points of conflict and increase safety. Existing intersections with secondary and tertiary streets can be eliminated by the use of cul-de-sacs with traffic routed along parallel streets to primary and secondary streets.

9.6.1.7 Include adequate sight distances to meet minimum standard requirements at all intersections. The location from where the driver is waiting to cross or enter a traffic lane to a point 23 meters (75 feet) down the centerline to the right and the left forms the sight triangle.

9.6.1.8 Minimize pedestrian and bicycle intersections with primary streets.

9.6.1.9 Provide crosswalks at all intersections where necessary, marked with paint or vinyl strips or identified with a different paving surface.

9.6.1.10 Provide pedestrian access to persons with disabilities in accordance with the *Americans with Disabilities Act Accessibility Guidelines (ADAAG)* and the *Uniform Federal Accessibility Standards (UFAS)*. In the event of a conflict the most stringent standards will be applied.

9.6.1.11 Create local service drives or access roads to parallel highways and primary roads to provide access to properties fronting the primary road avoiding a direct curb cut form the primary road to each individual property.

9.6.1.12 Intersections between railroad track and high-speed roads must be signaled, well marked and have a smooth transition. All other road crossings must be well marked and have clear line of sight down the tracks.

**9.7 ENTRANCE GATES**

9.7.1 The location and design of the installation entrance gates is a primary component of the installation circulation system. Entrance gates must be designed to be functional, while providing security protection not only for the installation itself, but also for
personnel and others waiting to be admitted to the installation. Gates should also be designed as a visual amenity to provide an aesthetically pleasing entrance to and exit from the installation. See Section 12, Force Protection, para 12.7 for information on the design standards for installation gates.

9.8 PARKING REQUIREMENTS

9.8.1 The total quantity of parking in any one location will vary with the needs of the facility. The following are general considerations considering parking requirements.

9.8.1.1 All parking lots will be accessible to persons with disabilities in accordance with the requirements of the UFAS, paragraph 4.1.1(5)(a) (Fig. 9.X). If parking spaces are provided for employees or visitors, or both, then accessible spaces shall be provided in conformance with the required minimum number of accessible spaces shown in Figure 9.X.

9.8.1.2 For initial planning and programming, allocate 400 square feet of parking lot area per car. The total provides adequate minimum space for the parking spaces, access drives, and planting islands that make up a parking lot. This allocation is not withstanding tactical military vehicles.

9.8.1.3 Minimize parking space requirements of a facility by selecting a site that will allow the sharing of parking with related activities.

9.8.1.4 Small parking lots are usually preferable to large lots because they enhance the visual environment by increasing the percent of landscaped area to paved area and allow more conformance to natural topography.

9.8.1.5 The monotony of large parking areas can be altered by the use of designs such as curvilinear parking or the introduction of large planting islands.

9.8.1.6 Promote means of access other than vehicular by providing alternative means of access such as walkways and bikeways.

9.9 PARKING LOT LOCATION AND DESIGN

9.9.1 Parking areas can be designed and enhanced to provide a more pleasing impact and a more comfortable physical experience for the user. The following design techniques should be used to
create more aesthetically pleasing, physically comfortable parking lots.

9.9.1.1 Locate parking lots between and behind buildings to reduce the visual impact from the circulation system.

9.9.1.2 Locate parking lots on relatively level areas to avoid excessive cut and fill.

9.9.1.3 Design parking lots to be efficient in the design and placement of access drives and parking spaces. All drives providing direct access to parking spaces should provide spaces on both sides of the drive.

9.9.1.4 Provide planting areas at the ends of all rows of parking spaces. Provide islands with trees within the main parking lot to soften the visual expanse of the parking lot, provide shade and/or wind breaks (Fig. 9.X).

9.9.1.5 Use natural topography and existing trees to visually screen parking areas from adjacent facilities and other parking bays (Figs. 9.X).

9.9.1.6 Design parking lots to preserve significant existing trees. Provide a planting area around the tree that is large enough to allow water to the root system.

9.9.1.7 On street parking along primary and some secondary streets should be avoided because it reduces the vehicular carrying capacity of the street, is visually unattractive, and is unsafe.

9.9.1.8 Parking lots should be paved with concrete, asphalt, or other paving material.

9.9.1.9 Parking structures, both below grade and above grade, provide for greater parking capacity in densely developed areas where available land is scarce. Parking structures are expensive, but they provide a number of benefits including efficient land use, reduced visual impact and protection of vehicles from inclement weather (Fig. 9.X). If parking structures are built they shall be designed to meet antiterrorism requirements.

9.9.2 Parking Area Design Guide. A comprehensive parking area design guide which includes siting, parking area types, geometry (parallel, perpendicular, angled), access, and maintenance consideration is located at the following website: U. S. Air Force Landscape Design Guide, Section 14, Parking Areas.
9.9.3 Antiterrorism Setback Requirements.

Parking lots within a controlled perimeter shall be located a minimum of 10 meters (33 feet) from inhabited structures, and 25 meters (82 feet) from troop billeting and primary gathering structures. Parking lots without a controlled perimeter shall be located a minimum of 25 meters (82 feet) from inhabited structures, and 45 meters (148 feet) from troop billeting and primary gathering areas (UFC 4-010-01, Table B-1). Designated parking for family housing located within secured perimeters with access control is excluded from the 25-meter (82 feet) setback requirement.

9.10 SERVICE AREAS

Facilities that require pickup and deliveries should have a service area that allows for easy access to a loading dock exclusively for service vehicles. These areas should be designed to provide direct, easy access for vehicles and not conflict with railroad operations (Fig. 9.X). They should be screened from public view to reduce negative visual impacts. Service areas shall meet all antiterrorism requirements.

9.11 DROP-OFF AREAS

Facilities that include a high percentage of persons arriving by vehicle should include a vehicle drop-off area for users. Included are buildings such as headquarters, child development centers, schools, dining facilities, and clubs. Antiterrorism standards state that the access drive must be clearly defined and marked and that their intended use is clear to prevent parking of vehicles in those areas and that drop-off lanes will not be located under any inhabited portion of a building (UCF 4-010-01, para B-1.4) It is recommended that physical barriers be used to define the area. These barriers may include curbing, planters, or other barriers together with signage to identify and restrict access. The driveway shall be configured so that vehicles can be restricted during times of high alert. Access to the driveway shall be located outside the standoff area with the initial approach parallel to the building, or a barrier must be directed to prevent direct vehicular movement toward the building (Fig. 9.X).

9.12 WALKWAYS AND PEDESTRIAN CIRCULATION

9.12.1 Walkways provide connections for pedestrians between buildings and ancillary facilities such as parking lots and other areas. Well designed and located pedestrian walkways also provide
a desirable alternative to total dependence on motor driven vehicles (Fig. 9.X).

9.12.2 The goal is to encourage the use of walkways as an alternative means of circulation. Pedestrian walkways should be designed and located to provide a comfortable, enjoyable experience for the user. The use of walkways within the installation promotes development sustainability by conserving energy, reducing air pollution, and decreasing the land requirement for parking. These walkways as well provide a means to increase physical fitness.

9.12.3 In order to achieve this goal the following objectives must be met:

- Provide walkways that are designed at a pedestrian scale to be comfortable and pleasant.
- Provide safe and secure pedestrian facilities that are separate from vehicular and railroad traffic.
- Provide amenities for pedestrians.
- Provide accessibility to all users, including physically impaired or challenged persons. All street and driveway crossings shall be ramped, marked, and accessible to persons with disabilities in accordance with requirements of the UFAS. See the following UFAS paragraphs for the respective standards: Curb Ramps, paragraph 4.7; Ramps, paragraph 4.8; Stairs, paragraph 4.9.
- Provide links to major attractions and generators of pedestrian traffic.
- Provide design consistency throughout the walkway and be well drained.

9.12.4 Walkway Network Hierarchy. Sidewalks are classified to conform to the hierarchy roadway system - Primary walkways, secondary walkways, and tertiary walkways. Non-roadway oriented sidewalks should be sized and placed where people will use them rather than creating worn “shortcut” paths. Railroad track crossings should be avoided, but where necessary, they should be well marked and have good line of sight. Walkways through railroad track ballast should be maintained with small, well-drained rock.
9.12.4.1 Primary Walkways.

9.12.4.1.1 Primary walkways (Fig. 9.X) should be placed along both sides of primary roadways, wherever possible, within the cantonment areas. These walkways are also used for high volume pedestrian routes to facilities and should be designed along axis lines relating to adjacent building entries, plazas, or streets. They should be paved with concrete, brick, or other pavers.

9.12.4.1.2 Primary walkways should be sized to accommodate anticipated pedestrian use. They should have a minimum width of 1.8 meters (6 feet), and a maximum width should be 3-3.5 meters (10-12 feet) in high use areas (Fig. 9.X).

9.12.4.2 Secondary Walkways.

9.12.4.2.1 Secondary walkways (Fig. 9.X) should be provided along one or both sides of secondary and tertiary streets. They are designed to carry moderate volumes of pedestrians between activity centers and housing areas. They should provide access to building entrances, plaza areas, or streets. They should be paved with concrete, brick, or other pavers.

9.12.4.2.2 These walkways should be sized to accommodate anticipated pedestrian use, but not less than 1.2 meters (4 feet), and a maximum of 3-3.5 meters (10 - 12 feet) in high use areas.

9.12.4.3 Tertiary Walkways.

9.12.4.3.1 Tertiary walkways (Fig. 9.X) provide pedestrian walkways in recreational and scenic areas for casual walking and hiking. They can be paved with concrete or bituminous asphalt or constructed with woodchips. The layout of the walkway should have a meandering and curvilinear alignment. Paved walkways should have a minimum width of 1.2 meters (4 feet). Wood chip trails should have a minimum width of 1 meter (3 feet) (Fig. 9.X). Where paths are designated for use by bicyclists and pedestrians, these widths should be increased an additional three feet for each bike lane.

9.12.5 Troop Running Trails.

Troop running trails should be provided for soldiers both in and out of formation. The width should 4.5-5 meters (approximately 15 feet) to provide the width necessary for four soldiers abreast with a cadence caller. Primary, secondary, and tertiary walkways can be designed to provide this function.
9.12.6 Troop Movement Paths.

In locations where troops need to move four (4) abreast; for example, troops marching in formation between classrooms, barracks/dinning hall facilities, a hard surface walkway of adequate width should be provided.

9.12.7 Site Amenities at Walkways.

9.12.7.1 Utilize site furnishings to reinforce the walkway system hierarchy. Provide directional and informational signage, where appropriate. Locate site furnishings, such as benches, tables, waste receptacles, drinking fountains, and signage in response to travel distance and traffic volume.

9.12.7.2 Site furnishings should be placed at regular intervals along walkways, parallel to the walk and facing the flow of pedestrian traffic.

9.12.8 Landscaping at Walkways.

Use a combination of canopy and ornamental trees along sidewalks to provide shade, define the path, provide visual interest, and discourage the creation of “shortcuts”. Utilize evergreen buffer plantings to screen harsh winds and undesirable views. Discourage the use of flowering/fruit bearing trees and shrubs along walkways because of threat of insects or other problems.

9.13 BIKEWAYS

9.13.1 The use of bicycles as alternatives to the automobile has become more acceptable to installation personnel. This trend is encouraged as a method of reducing the automobile vehicle trips within the installation and reduce the need for greater carrying capacity. Also, cycling is a popular recreation activity that is enhanced by the availability of a safe and well planned system of bike trails.

9.13.2 A bikeway system should provide direct routes between primary traffic and destination within the installation. This network should be continuous and minimize conflicts between bikes, pedestrians, and vehicles. Bikeways should be planned and designed according to the classifications that define the level of separation they maintain from roadways and walkways. The ideal solution for the development of bikeways is to physically separate them from both roadways and walkways.
9.13.3 Bikeways are design according to the following classifications:

9.13.3.1 Class I Bikeway. A Class I Bikeway is intended for the exclusive use of bicycles. While it may parallel a roadway, it is physically separated by distance or a vertical barrier (Fig. .X). Class I Bikeway considerations include:

- A class I Bikeway provides the safest and most efficient means of bicycle travel and is the preferred option for bikeway development.

- Crossing of a Class I Bikeway by pedestrians, train, or automobile should be minimized.

- If a Class I Bikeway does not closely parallel a roadway, it should be designed to provide appropriate bikeway gradient and curvature.

- Class I Bikeways require the greatest amount of space and advance planning to reserve land and assure appropriate routing.

- Railroad crossings should be well marked, with proper operating signals and clear sighting down the tracks. Road crossing transitions should be smooth and well drained.

9.13.3.2 Class II Bikeways. A Class II Bikeway shares the right-of-way with a roadway or walkway. It is indicated by a bikeway pictograph on the pavement and a continuous strip on the pavement or separated by a continuous or intermittent curb or other low barrier (Fig. 9.X). Class II Bikeway considerations include:

Fig. 9.X - Class I Bikeway

Fig. 9.X - Class II Bikeway
- Because some separation is provided for bicycle travel, a Class II Bikeway provides some level of safety for the bicyclist and pedestrian.

- While crossing by pedestrians or automobiles are discouraged, they are not as controllable as they are on a Class I Bikeway because the Class II Bikeway is adjacent to the walkway or roadway.

- Because Class II Bikeways are tied to the adjacent roadway or walkway, route selection is important to maintain appropriate bikeway gradient and curvature.

- Class II Bikeways generally require less space than Class I Bikeways because they follow the alignment of and share the right-of-way with a roadway or walkway.

9.13.3.3 Class III Bikeways. A Class III Bikeway shares the right-of-way with a roadway or walkway. It is not indicated by a continuous strip on the pavement or separated by any type of barrier, but it is identified as a bikeway with signs (Fig. 9.X). Class III Bikeway considerations include:

- Because no separation is provided, there is a higher potential for safety conflicts between automobiles and bicycles and between bicycles and pedestrians.

- Class III Bikeways provide continuity within the bikeway network and designate preferred shared routes to minimize potential conflicts. To maintain safety for bicyclist and pedestrians, Class III Bikeways should be developed, if possible, only where automobile and pedestrian traffic is moderate to light.

- Because Class III Bikeways share the roadway or walkway, route selection is important to maintain appropriate bikeway gradients and curvature.

- Class III Bikeways require

![Fig. 9.X - Class III Bikeway](image-url)
the least space because they share the pavement with a roadway or walkway.

9.13.4 General Guidelines.

9.13.4.1 Wherever possible, provide a designated right-of-way for bike traffic, separate from vehicular and pedestrian routes.

9.13.4.2 Locate bikeway crossings away from vehicular intersections with crossings marked on the street pavement.

9.13.4.3 When separate bicycle right-of-ways are not feasible, designate bikeway lanes with paint on the right-hand side of roadways.

9.13.4.4 Bikeways should never share undesignated space with roadways except at crossings.

9.13.5 Bikeway Furnishings. Encourage use of the bicycle system by making trails visually attractive and providing pedestrian amenities in appropriate locations. Provide site furnishings such as benches, tables, waste receptacles, drinking fountains, and signage along paths. Location of these amenities should be in response to travel distance and traffic volume.

9.13.6 Bicycle Storage. Provide bicycle storage racks in areas that can be visually supervised and in close proximity to building entrances, high activity areas, major workplaces, and recreational facilities, while avoiding conflicts with pedestrian circulation (Fig 9.X). Bicycle storage areas should be covered, especially at barracks, and easily accessible to building entrances (Fig. 9.X).

9.13.7 Landscaping. Use a combination of canopy and ornamental trees along bicycle paths for shade, route definition, and visual interest. Provide evergreen buffers to screen harsh winds and undesirable views.

9.13.8 Crosswalks. Provide crosswalks at all intersections of roads and walkways/bikeways. When laying out the crosswalk, consider the following:

- Extend walk's paving across the road in heavily used areas. Raised crosswalks eliminate the need for curb ramps in sidewalks.
• Provide a clear line of sight for motorist and pedestrians. Do not plant in sight lines. Walkways should meet the road at 90 degree angles (Fig 9.X).

• Adequate light should be provided.

• Provide barrier-free access at all intersections or used raised crosswalks.

9.13.9 Walkway and Bikeway Lighting Design. Roadway lights and building exterior lights can serve also as walkway and bikeway lights. Maximum use will be made of multi-purpose lighting systems. Paragraph 10.4 of Technical Manual (TM) 5-811-1, Electric Power Supply and Distribution directs the following walkway and bikeway lighting standards.

9.13.9.1 Intensities. Values are dependent upon whether walkways and bikeways are adjacent to roadways or are isolated from vehicular traffic.

9.13.9.1.1 Adjacent to Roadways. Walkways and bikeways will be illuminated to not less than one-half the maintained illumination required for adjacent roadways. Areas having in grade, such as stairs and ramps, will require special treatment. Crosswalks in the middle of the block will be illuminated to 1.5 to 2 times the normal roadway lighting level.

9.13.9.1.2 Remote from Roadways. Walkways and bikeways remote from roadways will have a minimum of 5 lux (.5 foot-candle) average illumination measured in lo-foot levels. Pedestrian tunnels will have 40 lux (4.0 foot-candles), stairways will have 6 lux (0.6 foot-candles), and overpasses will have 3 lux (0.3 foot-candles) illumination.

9.13.9.2 Pole design. Where pole mounted lights illuminate only walkways or bikeways, shorter poles are most suitable, but luminaire height will not be less than 10 feet. Construction will be such as to minimize vandalism by use of break-resistant lenses, tamperproof screws, and sturdy poles.

9.13.10 Signs. The federal Manual of Uniform Traffic Control Devices (MUTCD) provides standards signs and markings for bicycle lanes and related bicycle facilities. See the MUTCD, Chapter 9 and any applicable amendments for traffic controls for bicycle facilities standards.
9.14 ARMY STANDARDS

9.14.1 The cited Army Standards shall be met.

- **Army Regulation (AR) 420-72, Transportation Infrastructure and Dams**
- **Unified Facilities Criteria (UFC) 3-210-02, Design: POV Site Circulation and Parking**
- **Unified Facilities Criteria (UFC) 3-230-18FA, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas**
- **Unified Facilities Criteria (UFC) 3-260-02, Design: Pavement Design for Airfields**
- **Technical Manual (TM) 5-850-2/Air Force AFJMAN 32-1046, Railroad Design and Rehabilitation**
- **Manual For Railway Engineering**
- **Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings**
- **Americans with Disabilities Act Accessibility Guidelines (ADAAG)**
- **Uniform Federal Accessibility Standards (UFAS)**
- **Manual of Uniform Traffic Control Devices (MUTCD)**

9.15 REFERENCES

9.15.1 The following references are provided for guidance.

- **Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chap 9**
- **U.S. Air Force, Landscape Design Guide, Parking Area**
- **U.S. Air Force, Landscape Design Guide, Walkways and Bikeways** (Provides a comprehensive walkways...
and bikeways planning guide including sections on paving materials and gradients and curvature data).

- **Chicago's Bike Lane Design Manual** (Provides a comprehensive series of technical drawings and design specifications for bike lanes).
10.1 INTRODUCTION

10.1.1 The Landscape Design Standards includes the selection, placement, and maintenance of plant material on the installation. Landscape plantings provide a simple and cost effective enhancement to the general appearance of the installation.

10.1.2 Plantings add an element of human scale to open spaces and can be used functionally to screen undesirable views, buffer winds, reinforce the hierarchy of the circulation system, or provide a visual transition between dissimilar land uses.

10.1.3 The visual image conveyed by a military installation is defined not just by architectural character and site organization, but also by an attractive, organized landscape design. The presence of plant material on the installation greatly enhances the visual character and environmental quality of the installation.

10.2 LANDSCAPE OBJECTIVES

10.2.1 The overall objective of the use of plant material within the installation is to improve the physical and psychological well being of the people who live and work on the installation. This is achieved through the following objectives:
10.2.1.1 Preserve and enhance urban trees, forest lands, and detailed planting features such as shrubs and groundcovers.

10.2.1.2 Improve the overall visual quality of the installation through the use of native plant material to (Fig. 10.X):

10.2.1.2.1 Blend to built environment with the natural environment.

10.2.1.2.2 Provide scale and comfort to pedestrian environments (Fig. 10.X).

10.2.1.2.3 Reinforce the hierarchy of the circulation system.

10.2.1.2.4 Screen unsightly views or elements.

10.2.1.2.5 Buffer incompatible land uses.

10.2.1.2.6 Minimize maintenance through the use of native plant materials that require less maintenance to survive.

10.2.1.2.7 Enhance Antiterrorism capabilities.

10.3 PRINCIPLES OF LANDSCAPE DEVELOPMENT

10.3.1 Landscape design is based on the following principles (Fig. 10.X).

10.3.1.1 **Unity.** The selection and placement of plant material can be used to blend, screen, and soften incompatible architectural or other unattractive visual impacts. Plant material as a unifying element can be placed in front of a building or view to frame and enhance the visual impact.

10.3.1.2 **Balance.** Plant material can be selected and placed to provide visual equilibrium or balance through the use of either a symmetrical or asymmetrical planting scheme. Symmetrical plantings are generally more formal while asymmetrical plantings are informal.

10.3.1.3 **Contrast.** Plant material can be selected and placed to provide differences in size and shape that add interest to the environment. Plants can be located to provide a backdrop for other plants such as a hedge behind a bed of annuals or perennials.

10.3.1.4 **Rhythm.** Repetition of a single plant or a mass of plants provides visual interest and formality to the landscape.
Rhythm produces emphasis and unity and is especially effective in articulating main circulation routes.

10.3.1.5 **Color and Texture.** Plants can be selected and placed to provide visual interest according to their color and texture. Colors are classified as either warm (red, orange, yellow) or cool (violet, blue, green). Texture is classified as either coarse or fine.

10.3.1.6 **Simplicity.** Landscape plans should be broad and simple in form to limit excessive maintenance. Plant material should be grouped in beds with simple edges that are easy to mow. Small turf areas should be avoided because of the difficulty of mowing. The use of annuals should be minimal because of the high maintenance involved.

10.3.1.7 **Ultimate Effect.** The landscape plan should be prepared with consideration for the mature size of all plants. The spacing of all material should utilize nursery industrial standards for mature material to account for spread as well as height. The ultimate height of the material should also be considered in relation to windows and other visual concerns.

10.3.1.8 **Spatial Articulation.** Plants can be selected and placed to create enclosed spaces or to separate spaces from one another. They can also be used to direct people by visually defining and reinforcing patterns of movement. The degree of enclosure, separation, or movement is dependent upon the density, form, and type of plants used.

**10.4 SUSTAINABLE LANDSCAPE DEVELOPMENT**

10.4.1 The use of plant material on the installation promotes the sustainability of the development. Trees, shrubs, groundcover, and vines provide aesthetic appeal as well as preservation of fauna and flora, energy conservation, climate modification, erosion control, air purification, and noise abatement (10.X).

**10.5 LANDSCAPE DESIGN GUIDELINES**

10.5.1 Proposed plantings must be reviewed to ensure that site conditions (soil, topography, adjacent uses, and architecture) and climatic criteria (sun, shade, and moisture requirements) are considered in the desired plant design and selection (i.e., form, texture, color, size). The uses and users of the site must also be considered. Landscape planting plans should be approved by qualified personnel to provide quality assurance and promote design consistency within each visual zone.
10.5.2  The following paragraphs present landscaping guidelines for the various locations of plant material use.

10.5.2.1  **Foundation Planting.** Foundation planting provides a green background for additional plantings, adds scale and character to the building, helps to integrate the building with its surroundings, screens HVAC and other utilities and helps create a sense of arrival (Fig. 10.X). When developing foundation planting plans consideration should be given Antiterrorism measures (See paragraph 10.11).

10.5.2.1.1  Focal and seasonal plantings should be located at building entries for pedestrian interest.

10.5.2.1.2  Use the architecture of the building to evaluate the planting design and selection of plants.

10.5.2.1.3  Plant materials should not block windows and views from interior spaces.

10.5.2.1.4  Trees shall be setback from the building walls to provide space for mature growth and to prevent root systems from damaging the foundation.

10.5.2.1.5  A symmetrical foundation planting design should be used for a symmetrical building.

10.5.2.1.6  Due to the possibility of insect problems (bee stings, etc.) do not plant flowering plants near entrances.

10.5.2.2  **Screening.**

10.5.2.2.1  **Windscreens.** Use a combination of evergreen and deciduous trees to provide windbreak protection from prevailing winds. Windbreak plantings should be irregular in form, rather than straight and evenly spaced, in order to provide more effective wind control and to visually blend with the natural character of the installation.

10.5.2.2.2  **Screening of Dumpsters.** Landscape planting should be used to supplement wood fence and masonry wall dumpster enclosures (Fig. 10.X).

10.5.2.3  **Buffer Planting.** Use a mixture of evergreen and deciduous trees and shrubs to visually separate land uses and to help separate visual zones.
10.5.2.4  **Open Space Planting.** Enhance open space areas with planting. Use a mix of evergreen, deciduous, and flowering trees. Plant the same kind of trees in massive groupings to impact the vast open areas (Fig. 10.X).

10.5.2.5  **Street Trees.** Street tree plantings should be used to reinforce vehicular hierarchy, orient and direct traffic, upgrade views, and to visually de-emphasize on-street parking (Fig. 10.X). Also, in the design of a street tree planting, separate plant species may be used to identify distinctive details or areas of the installation, for example, a particular land use relationship, historical district, community area, or other similar entity.

10.5.2.5.1  Use formal street trees in single rows to visually reinforce primary and secondary roads. Use regularly spaced and uniformly shaped deciduous trees to provide a regimented appearance.

10.5.2.5.2  Use informal groupings of street trees along tertiary routes. Utilize medium size deciduous trees to screen on-street parking along roadways. Set trees 1 to 2 meters (3 to 6 feet) from the back of curbs (Fig. 10.X). Spacing should be uniform, except where curb cuts interrupt regular spacing.

10.5.2.5.3  As a general rule, street trees should be deciduous species, resistant to salt and root pressure, and should have a 10' to 12' high clearance between the street pavement and branch height to allow adequate clearance for pedestrian and vehicle traffic to pass unimpeded by lower branches.

10.5.2.5.4  The street tree layout should be coordinated with the layout of proposed street lighting.

10.5.2.5.5  Appropriate plant heights should be used within sight triangles to ensure safe views from intersections.

10.5.2.5.6  Weeping trees should not be used in locations where they may hang over the roadway or block views.

10.5.2.6  **Parking Lot Planting.** Parking lots are often the least attractive elements on a military installation. The use of landscape plant material and earth berms can greatly improve the appearance of these areas as well as help define circulation and reduce heat gain during summer months (Fig. 10.X).

10.5.2.6.1  Use shade tree plantings at parking lots to reduce glare and moderate ambient air temperatures on the lot. Optimum
spacing of parking lot shade trees is 10 to 12 meters (35 to 40 feet) on center.

10.5.2.6.2 Choose trees and shrubs that require minimum maintenance and will not litter the parking area with leaves, fruit, or nuts.

10.5.2.6.3 Consider sight distances near entrances and exits when selecting and placing plant material.

10.5.2.6.4 Select trees, shrubs, and ground covers that can withstand harsher conditions, such as sun, glare, heat, and reduced water supply.

10.5.5.6.5 Use a mix of evergreen and deciduous plant material to screen parking areas from adjacent uses.

10.5.2.7 Environmental Control Planting. When properly placed, plants can provide environmental benefits, as well as address visual concerns.

10.5.2.7.1 Use deciduous trees and shrubs at courtyards, buildings and along streets to provide shade, moderate temperatures and reduce glare during the summer months while allowing solar exposure in the winter.

10.5.2.7.2 Locate deciduous plantings on the southeast and southwest corner of buildings or courtyards to mitigate solar radiation and glare due to heat build-up and lower sun angles in the mid-morning and late afternoon hours.

10.5.2.7.3 Use mixed massings of deciduous shrubs and evergreen trees and shrubs to provide sound control along primary and secondary roads.

10.5.2.8 Image Planting. The image of the installation is formed by the visual impressions that exist within the installation. The primary locations of highly visible images are the main gate, along primary circulation systems, and at areas of high concentrations of people. Features such as signs, statues, static displays, and other primary visual images can be improved by the use of trees, shrubs, and ground cover.

10.5.2.9 Entrances to the Installation. The entrances and streetscapes into the installation are areas to place landscaping that will develop a strong visual image and provide visual interest.
during all four seasons. The entrance to the installation creates the first visual impression for the visitor (Fig. 10.X).

10.5.2.9.1 The landscape materials and planting areas should be proportional in scale to the hierarchy of the street on which they are located.

10.5.2.9.2 Landscaping must be integrated with the Force Protection requirements of Section 12. Low shrubs, groundcover, annual/perennial plants and canopy trees provide seasonal interest as well as maintain views required to ensure force protection measures. Large evergreen trees are discouraged in these locations because they may obstruct sightlines and impact the need for force protection. Adequate lines of sight must be maintained for guard personnel to observe vehicular and pedestrian traffic approaching the gate.

10.5.2.10 Zeroscaping. Where appropriate, to conserve water and lower maintenance consider zeroscaping.

10.5.2.11 Xeriscape. Xeriscape is the conservation of water and energy through creative and adaptive landscape design. Xeriscape landscapes provide attractive solutions that save money, water, and maintenance. The following website provides guidance on specific design principles of the xeriscape design process and xeriscape design application:


10.6 PLANT MATERIAL SELECTION

10.6.1 Trees, shrubs, ground cover and turf are the major elements of a planting composition. Basic plant selection criteria should consider creating a unified composition utilizing native materials for low maintenance and sustainability, avoiding incompatible colors, textures and forms, and matching the appropriate plant to the land use, situation, and environmental condition.

10.6.2 The ability of plant material to provide lasting benefit is dependent upon the plant's hardiness and its appropriateness to the site use. Major factors affecting plant hardiness are soil type and organic content, temperature, moisture and light. These climatic conditions can be modified to an extent by specific site conditions, such as wind protection, solar orientation, and planting design, to create microclimates.

<table>
<thead>
<tr>
<th>Plant Categories</th>
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<tbody>
<tr>
<td>Cultural Characteristics</td>
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<td>Growth Rate-Medium</td>
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<tr>
<td>Growth Rate-Slow</td>
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<td>Disease/Pest Resistance</td>
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<td>Alkaline Soil Tolerant</td>
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<td>Poor/Rocky Soil Tolerant</td>
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<td>Salt Tolerant</td>
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<td>Shade Tolerant</td>
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<td>Summer Wind Tolerant</td>
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<td>Urban Condition Tolerant</td>
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<th>Ornamental Characteristics</th>
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<td>Ornamental Bark</td>
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<tr>
<td>Ornamental Fruit</td>
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<tr>
<td>Red/Crimson/Purple Fall Color</td>
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</tbody>
</table>

Fig. 10.X – Plant Categories
10.6.3 Selecting appropriate plants for a given condition is only one aspect of planting design. Compositional arrangement to provide texture variety and to accent site and building features is another. The selection and composition of a planting design requires an understanding of each plant's characteristics, form, and environmental needs as well as how each plant can relate to and complement other plants in the design. Plants are used in four basic design categories (Fig 10.X):

- Canopy
- Barrier
- Screen (or Baffle)
- Groundcover

10.7 PLANT PALETTE AND PLANT CATEGORIES

10.7.1 The plant palette and categories are designed to help the designer choose the best plant for each particular set of design requirements. The plants that appear on the palette and in the categories were selected for their hardiness and their ability to survive in this geographical area. To use them effectively, the design requirements must be well defined for the specific site.

**Installation:** Complete Appendix O, Plant Palette using selected plants from your geographical area and complete the plant categories files with the respective information for each plant section (See the CATEGORIES.XLS file).

10.7.2 The Plant Palette.

10.7.2.1 A select group of plant materials has been divided into the following six categories:

- deciduous trees
- coniferous trees
- deciduous shrubs
- coniferous shrubs
- broadleaf evergreen shrubs
- groundcover and vines

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**Plant Categories Cont.**

**Ornamental Characteristics**
- Pink/Purple Flowers
- Red/Crimson Flowers
- White/Cream Flowers
- Yellow/Orange Flowers
- Yellow/Orange/Red Fall Color

**Functional Characteristics**
- Erosion Control/Bank Stabilizer
- Foundation Plants
- Large Hedges (+25')
- Medium Hedges (10-20')
- Low Hedges (4-10')
- Naturalizing/Conservation
- Park Trees
- Large Street Trees (+35')
- Small Trees (15-35')
- Thorny Plants

Fig. 10.X – Plant Categories Continued
10.7.2.2 On the palette, the plants appear in alphabetical order by their botanical name, followed by their common name, design characteristics, cultural information, recommended use, and miscellaneous notes. The plant palette is presented in a matrix format in Appendix O.

10.7.3 The Plant Categories.

10.7.3.1 Plants from the plant palette with similar characteristics have been cataloged in the Plant Categories (Fig. 10.X). These characteristics could be cultural (e.g., upright, narrow form), environmental (e.g., shade tolerant), ornamental (e.g., red fall color), or functional (e.g., screening plant). Characteristics include:
- Cultural Conditions (mature height and spread, form and growth rate, disease and pest resistance),
- Environmental Conditions (sun/shade, pH range, soil moisture required, and wind/sun), and
- Ornamental Characteristics (flower color, autumn color, fruit color, and/or summer leaf color).

10.7.3.2 Each category describes a list of plants that share a similar quality. For example, materials that are shade tolerant would be placed in the Shade Tolerant group under the "Environmental Conditions" heading. To further explain the Categories, under the "Environmental Conditions" heading, in the

**Fig. 10.X - Install Plant Material According to Industrial Standards**
Shade Tolerant group, all shade tolerant deciduous trees would be listed under “Deciduous Trees”; all shade tolerant Coniferous trees would be listed under "Coniferous Trees"; and so on.

**10.8 PLANT MATERIAL INSTALLATION**

10.8.1 A key step in assuring successful planting is to select plants of the highest quality. Plant material should be of the size, genus, species, and variety to comply with the recommendations and requirements of the "American Standard for Nursery Stock" ANSI Z60.1.

10.8.2 As part of the design process and prior to plant installation, review the installation's Master Plans, Basic Information Maps, or As Built Drawings for utility locations and verify with the Directorate of Public Works or equivalent.

10.8.3 The planting and establishment of trees, shrubs, ground covers, and vines is detailed in **TM 5-803-13**, Chapter 3.

10.8.4 General Guidelines for Plant Installation.

10.8.4.1 At planting time, thin plants by removing one-third of the vegetative material.

10.8.4.2 Spray all evergreens with an antidesiccant within 24 hours of planting.

10.8.4.3 Water all plants thoroughly during the first 24-hour period after planting.

10.8.4.4 Site all plants and stakes plumb.

10.8.4.5 Space plants according to their mature size (Fig. 10.X).

10.8.4.6 Install plant materials in groups for greater impact (Fig. 10.X).

10.8.4.7 Installation of Lawn Areas.

10.8.4.8 Installation techniques for turf are detailed in **Unified Facilities Criteria (UFC) 3-210-05FA, Design: Landscape Design and Planting Criteria**, Chapter 4. The details include site evaluation, site preparation, selection of turf, and maintenance requirements.
10.9 MAINTENANCE OF PLANT MATERIAL

10.9.1 The ease of maintenance should be one of the primary goals when considering the success of any planting design.

10.9.2 Pruning. In general plant material should be allowed to conform to its natural shape. This practice allows the plant to mature in a health manner, and saves the time and energy required for trimming. The pruning of trees and shrubs is done to maintain overall plant health, direct plant growth, maintain a desired shape, and increase flower or fruit development.

10.9.2.1 Pruning Shrubs.

- Do not prune shrubs flat across the top.

- Prune branches yearly on thick-branched shrubs and at the base of the shrub.

- When pruning deciduous shrubs prune shrub stems as close to the ground as possible and shrub branches as close to the stem as possible.

- When "thinning out" deciduous shrubs prune about one-third of all branches where they meet their main stem.

10.9.2.2 Pruning Trees.

- Remove a large limb by making three cuts as follows:

  - Make the first cut at the bottom of the branch 12-24" from the branch attachment (Cut A, Fig 10.X).

  - Make the second cut on the top of the branch within 1" of the undercut (Cut B, Fig 10.X).

  - Make the final cut just beyond the outer portion of the branch collar (Cut C, Fig 10.X). The first two cuts were necessary to remove the weight of the branch to allow cut #3 to be clean without ripping the bark.

- Never cut the central leader of the tree.

- Coniferous evergreens trees should be pruned, during the spring, by snipping off new growth. Avoid geometrically shaping plant material while pruning.
10.9.3 Mulching.

- Use mulch around the base of plant material to provide for greater moisture and help inhibit the growth of weeds and grasses. Mulch should be maintained at a depth of two (2) to four (4) inches.

- The best time to mulch for water conservation is in the late spring. Apply mulch immediately to new fall plantings.

10.9.4 Ground Cover Maintenance. Although ground covers do not require pruning, they may be periodically dug up in the spring or fall for propagation and to prevent overcrowding in their beds.

10.9.5 Landscape Maintenance Schedule. The general objective of a landscape maintenance schedule is to ensure an orderly and efficient care of the grounds. The landscape maintenance schedule included in the Army Installation Design Guide (See Appendix F) identifies times throughout the year when specified maintenance should be undertaken. Use of the landscape maintenance schedule will improve all aspects of landscape on the installation. Materials and supplies can be ordered in a timely fashion, manpower needs can be calculated and anticipated, and a correlation between the level of maintenance and appropriate cost can be derived.

_Installation:_ Develop a landscape maintenance schedule for your particular geographical area and attach as an appendix.

10.10 TREE PROTECTION AND PRESERVATION

10.10.1 Existing urban trees and forest should be preserved if they are in good health. Construction should be planned to provide for the preservation of significant trees.

10.10.2 During the clearing and construction process, trees should be protected from damage. Construction barricades should be erected to protect the existing trees to be preserved. The barricades should be no closer to the trunk of the tree than one-half the distance from the trunk to the drip line. Existing trees that cannot be preserved should be considered for transplanting to a different location on site or to a different site.

10.10.3 Changes in the grade of the soil around trees can cause extensive root damage and eventually death of the tree. To prevent damage to the tree, it is important to maintain the existing grade for at least the size of the tree’s canopy (the drip line) (Fig. 10.X).
10.11 ANTI-TERRORISM/FORCE PROTECTION CONSIDERATIONS

10.11.1 The presence of vegetation on an installation can have both beneficial and detrimental impacts on security. The selection and placement of landscape plant material on Army installations is an integral element in the provision of protective measures to reduce the threat of terrorism.

10.11.2 Proper selection and placement of trees and shrubs can be utilized to provide visual screening without creating concealment for covert activity. The landscape architect responsible for tree placement should work closely with installation force protection experts to design a landscape plan that provides visual screening without compromising Antiterrorism measures (Fig. 10.X).

10.11.3 The plant material must allow building occupants to see out, but must not allow outside forces to monitor interior activity. The landscape architect should incorporate the following aspects into the design:

- Avoid conditions within 10 meters (33 feet) of inhabited structures that permit concealment of aggressors or obscure the view of objects or packages 150-millimeters (6 inches) in height from the view of security personnel. This results in the placement of shrubs and trees that are loose rather than dense in growth habit and possess multiple small stems rather than a single trunk that will obscure a 150 mm (6 inch) package.

- Vegetation groupings provide reduction of blast effect.

- Plant material selection and placement shall minimize potential hiding places for bombs and aggressors.

- Provide vegetation screens for play areas and outdoor recreation areas to obscure from off-installation view.

- Use trees to obscure sight lines of on-installation buildings from off-installation buildings (Fig. 10.X).
10.12 ARMY STANDARDS

10.12.1 The cited Army Standards shall be met.

- Army Regulation (AR) 420-70, Buildings and Structures

- Unified Facilities Criteria (UFC) 3-210-05FA, Design: Landscape Design and Planting Criteria

- Technical Manual (TM) 5-630, Natural Resources Land Management

- American Standard for Nursery Stock, ANSI Z60.1

- Overseas (Host Nation Standards)

10.13 REFERENCES

10.13.1 The following references are provided for guidance.

- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chap 10

- USAF Landscape Design Guide

Installations - Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation to meet Army standards.

11.1 INTRODUCTION

11.1.1 Site elements include all visual elements of the installation that are considered utilitarian in use (Fig. 11.X). These elements include the following four categories of utilitarian amenities:

- Site Furnishings
- Signs
- Lighting
- Utilities

11.1.2 The four sub-components provide dominant visual impacts within the installation. The specific site element features and equipment should, to the extent possible, reflect the local or regional design standards. This allows for ease of maintenance and blending into the local community. The four sub-components and their visual impacts are discussed in detail in this chapter.

11.1.3 Overseas installations should reflect consideration of local design standards.
11.2 SITE ELEMENT OBJECTIVES

11.2.1 The site element plans for existing and future installation use should be prepared and the site elements selected to enhance the sustainability of the installation. To this end, site elements should meet the following objectives:

11.2.1.1 Provide site elements that are appropriate to their intended function.

11.2.1.2 Establish a coordinated system of site elements that provide consistency and continuity throughout the installation to convey a sense of organization.

11.2.1.3 The design and location of the various site elements should express an image, character, and scale appropriate to the installation.

11.2.1.4 Design and locate all site elements to meet AT/FP requirements.

11.2.1.5 Use recycled/salvaged materials wherever possible.

11.2.1.6 Minimize maintenance and repair through the use of efficient products that are vandal-proof.

11.2.1.7 Minimize negative visual impacts of all utility systems (Figs. 11.X and 11.X).

11.2.1.8 Minimize environmental impacts of all utility systems.

11.3 SITE FURNISHINGS

11.3.1 Site furnishings include all of the utilitarian outdoor amenities found on an installation. These outdoor furnishings should be located in coordinated clusters to provide areas of multi-furnishing amenities, and avoid the haphazard proliferation of furniture elements around the installation. All furnishings shall be accessible to, and usable by, persons with disabilities, in accordance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS), with the most stringent standards to apply in the event of conflicts.
11.3.2 Site furnishings include the following:

- Seating
- Tables
- Telephone Booths
- Shelters
- Kiosks
- Walls and Fences
- Trash Receptacles
- Dumpsters
- Flagpoles
- Movable Planters
- Bicycle Racks
- Tree Grates
- Bollards
- Play Equipment
- Mailboxes

- Monuments, Memorials, Military Equipment Static Displays
- Drinking Fountains

11.3.3 Seating. Seating includes benches and walls, as well as tables and movable chairs.

11.3.3.1 Benches.

11.3.3.1.1 Bench Location. Benches should be located in areas of high pedestrian use, and arranged to encourage socialization within a pleasant outdoor setting. This includes pedestrian nodes along primary walkways, at major building entryways, courtyards, and at bus stops.
11.3.3.1.2 Bench Sitting. Benches should be sited on concrete pads adjacent to walkways. Provide proper clearance around benches, a minimum 2’0” setback from adjacent sidewalks and a minimum of 5’0” between front of bench and any stationary obstacle. Provide appropriate planting treatment for visual definition and seasonal shade.

11.3.3.1.3 Bench Design.

*Installation: Specify the type of bench or benches that are to be used throughout the installation, include the manufacturer and style name, number, and color. Note: follow the previous material by "or equal".*

*Suggested material follows.*

11.3.3.1.3.1 Wood Benches. Wood benches with backs are appropriate for the informal gathering, resting, eating and waiting uses characteristic of the community facility areas. Benches should be a contoured style, constructed of 2 1/2” x 2 1/2" redwood or dark brown recycled plastic members. Standard bench size should be 6'-0" long. Metal support base should have a dark brown factory finish to match standard trim color. Bench dimensions should meet specifications presented in the Technical Manual (TM) 5-803-5, Installation Design Manual, Fig. 2.5, page 8. Wall mounted benches should be similar in style and color to free standing benches.

11.3.3.2 Seating Walls.

11.3.3.2.1 Seating Walls Location. Wherever possible, seating should be incorporated into planter boxes or retaining walls, particularly at building entrance area. Seating walls should be integrated into the overall area design and the pedestrian circulation system.

11.3.3.2.2 Seating Wall Design. Seating walls should generally be between 18” and 22” high, and 12” to 18” wide and constructed of textured concrete or brick in a manner to complement or match the materials of the adjacent buildings (Fig. 11.X).

11.3.3.3 Tables. Locate tables together with seating that is oriented to the user needs of socializing, relaxing, or eating in less formal spaces with a pleasant setting and attractive view.

11.3.3.3.1 Table Location. Small groupings of tables in high visibility areas should be placed within proximity of recreation or
food service facilities. These groupings should be located on hard pavement areas adjacent to walkways. Pavement should be constructed of exposed aggregate or broom finish concrete. Incorporate tree plantings and overhead trellis structures within these areas to provide shade and spatial definition (Fig. 11.X).

**Installation:** Specify what type of tables are to be used throughout the installation, include the manufacturer and style name, number, and color. Note: follow the previous material by "or equal".

11.3.3.2 Table Materials. **Installation: Complete**

11.3.3.4 Chairs. **Installation:** Specify what type of chairs are to be used throughout the installation, include the manufacturer and style name, number, and color. Note: follow the previous material by "or equal".

11.3.3.4.1 Chair Type(s). **Installation: Complete**

11.3.4 Telephone Booths. Telephone booths should be incorporated into building architecture, utilizing building recesses and overhangs, or integrated into bus or other shelters. Provide a minimum 3’0” clearance between booths and the edge of walkways. All service line wiring should be underground or concealed. Booths should be equipped with lighting for nighttime use. In sheltered areas, use standard wall-mounted phone enclosures.

11.3.5 Shelters.

11.3.5.1 There are many different types of shelters on military installations. Shelters are provided for those waiting for buses, and in areas where people congregate to socialize or eat such as in courtyards or picnic areas.

**Installation:** Specify what type of shelter(s) are used throughout the installation. For example, what type of shelter is used at bus stops and types used in courtyards and picnic areas.

**Suggested material follows.**

11.3.5.1.1 Bus Shelters.

11.3.5.1.1.1 Bus Shelter Location. Bus shelters should be located at major facilities along the bus route such as
Commissary/Post Exchange areas, barracks areas, Hospital, and Library. Bus stops should relate to major pedestrian walkways, and be placed on concrete pads. Provide a minimum 3'0” clearance between shelters and the edge of walks.

11.3.5.1.1.2 Bus Shelter Design. Bus shelters should provide protection from wind, rain, and sun with an overhead roof with enclosure on three sides. Side enclosures should be a transparent, unbreakable type material to allow for adequate visibility. Bus shelter design typically should be simple and consistent throughout the post, matching the existing units in terms of materials, scale, and detail. Shelter design should have similar character as that for kiosks and vending machine shelters. Bus shelters should have a minimum size of 5' by 8' with a minimum height of 6’-6" from floor to underside of roof. The shelters should include an integral bench, trash receptacle, and ashtray.

11.3.5.1.2 Picnic Shelters.

11.3.5.1.2.1 Picnic Shelter Location. Picnic shelters should be strategically located and sized for shared use to discourage the proliferation of small shelters scattered throughout the installation.

11.3.5.1.2.2 Picnic Shelter Design. Picnic shelters can be open on all sides. The minimum size should be 20 feet square with a minimum 8-foot vertical clearance.

11.3.6 Kiosks

11.3.6.1 Kiosks Location.

Kiosks can be used as information centers at pedestrian nodes within the town center. Provide kiosks only where they are needed on a concrete base adjacent to walkways. Allow a minimum of 3’ clearance on all sides.

11.3.6.2 Kiosks Design.

Kiosk design should blend compatibly with other site furnishings and with the architectural character of the zone in terms of form, scale, and materials. A similar design treatment should be established for kiosks and shelters.

11.3.7 Walls and Fences.

11.3.7.1 Location and Use.
Walls and fencing should be used to provide visual screening, define pedestrian plaza areas, wind screening, pedestrian and vehicular control, security, and to retain soil. The design of walls and fences should fulfill their function in harmony with the character and appearance of their setting.

11.3.7.2 Walls.

Low walls should be used to define pedestrian court areas and provide informal seating. Screening walls can be used where appropriate to screen building service areas. Walls adjacent to walkways should be free of any projections, such as signs or drain pipes that would pose a hazard to passing pedestrians. Construction of walls should incorporate either brick to match adjacent buildings, with stone or concrete cap (Fig. 11.X), or concrete with a textured finish and stone or concrete cap. Retaining walls may be constructed of brick, native stone, versa-lock modular stone with a light tan finish, or concrete block with a light tan stucco finish, concrete block planters, or other appropriate material (Fig. 11.X). Walls used to screen service areas or trash enclosures should incorporate landscape plantings to help reduce the negative visual impact of these areas.

11.3.7.3 Fences. Installation: Rewrite to installation standard.

Fences should be utilized for screening of service areas and site utilities, particularly dumpsters. Screen fencing should consist of square tubular metal posts and rails with vertical wood fence boards. All fence posts should be securely anchored with concrete footings. All metal posts and framework should be painted standard dark brown and wood fencing should be western cedar. Hardware shall be stainless steel to prevent rust. Chain link fences should be screened with trees and shrubs. The use of chain link fence should be held to a minimum in the cantonment area.

11.3.8 Trash Receptacles.

11.3.8.1 Trash Receptacle Location.

Trash containers should be highly visible and accessible for effective litter control. Containers should be located conveniently along walkways, near major pedestrian intersections, near building entrances and near seating and eating areas. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas.
11.3.8.2 Trash Receptacle Design.

Container should be of a design that is compatible and in harmony with other site furnishings.

**Installation:** Specify what type of trash receptacles are to be used throughout the installation, include the manufacturer and style name, number, and color. Note: follow the previous material by "or equal".

11.3.8.3 Trash Receptacle Type. **Installation:** Complete

11.3.8.4 Dumpsters.

11.3.8.4.1 Dumpster Location.

The location of dumpsters can have a significant visual impact and should be addressed as part of an overall building design and incorporated in site planning. To the greatest extent possible, incorporate dumpster placement into areas screened with walls, fencing, or plant material (Fig. 11.X). Avoid locating dumpsters along major circulation or use areas. Dumpsters should be directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas (Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, Table B-1).

11.3.8.4.2 Dumpster Site Design.

Incorporate plantings to buffer the visual impact of screen walls. Walls or fencing should be a maximum 6’ in height. Provide a minimum 3’ clearance on each side between screen walls and dumpsters to allow adequate pedestrian and truck access. All dumpsters should be placed on concrete pads with aprons large enough to encompass the bearing points of the service vehicle.

11.3.9 Flagpoles.

The standard flagpole for *(Installation Name)* will be tapered mill finish aluminum, fitted with a gold anodized finish “ball” finial (Figure 11.X). The mounting detail should be simple with a
concrete base flush at grade. A concrete pad should be used when poles are located in lawn areas. In plaza areas, flagpole locations and mounting detail should be integrated into the paving pattern. Flagpoles should include lighting and may be accented with planting beds around the base of the flagpole.

11.3.10 Planters.

11.3.10.1 Movable pre-cast concrete planters may be used outside building entrances to provide seasonal color and interest and function as security threat barriers (Fig. 11.X). Planters should be located so they block uninterrupted vehicular access to a building, but not so they excessively impede pedestrian movement. Several planters of various sizes should be grouped together to produce an aesthetically pleasing display.

11.3.10.2 Planters Sizes and Design.

**Installation:** Specify what planters to use throughout the installation, include the manufacturer and style name, number, and color. If a variety of sizes and styles are deemed necessary define the size and style to be used for specific circumstances.

11.3.11 Bicycle racks.

Bicycle racks should be provided at key destination locations. They should be located on a concrete surface where they will not impede pedestrian movement or block building entrances. **Installation:** Rewrite to installation standard.

A ribbon type tubular aluminum bike rack with an anodized dark bronze finish is the post standard (Fig. 11.X). Bicycle storage areas near barracks should be covered.

11.3.12 Tree Grates.

Tree grates should be used when installing trees in large paved areas such as pedestrian plazas, walks, and ceremonial entrance courts. Tree grates and planting pits should be a minimum of 5’x 5’.

11.3.13 Bollards.

Bollards are utilized to separate vehicular and pedestrian traffic, to direct access, or as decorative elements in pedestrian areas. **Installation:** Specify the installation-wide bollard standard and provide the recommended locations for bollards. If a variety of
sizes and styles are deemed necessary define the size and style to be used for specific circumstances.

11.3.14 Playgrounds/Tot Lots.

11.3.14.1 The playgrounds and tot lots within the installation should use equipment that is consistent throughout the installation or that meets specific criteria of materials, color, and design (Fig. 11.X).

11.3.14.2 Playground Planning and Design.

Guidance for planning and designing unsupervised outdoor play areas that meet child safety and child development requirements is found in Unified Facilities Criteria (UFC) 3-210-04, Design: Children’s Outdoor Play Areas. The guidance given in this publication meets the needs of children with and without disabilities.

11.3.14.3 Playground Inspection and Maintenance.

A play area inspection and maintenance program for Child Development Centers can be found in Technical Manual (TM) 5-663, Child Development Center, Play Area Inspection and Maintenance Program.

11.3.14.4 Recalled and Banned Playground Equipment.

For updates on banned or recalled playground equipment consult the Consumer Product Safety Commission Press Releases and Recalls web site.

Installation: Specify a set of design standards for the selection and placement of playground equipment or a specific manufacturer with style name, style number, and color. Note: follow the previous material by "or equal".

11.3.15 Mailboxes.

11.3.15.1 All mailboxes should be located in close proximity to the facility they serve. However, when locating mailboxes consider the potential for the site element being used as a container for the concealment of explosive, etc. Consider Antiterrorism/force protection requirements for locating similar container types i.e. trash receptacles which are located a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) form billeting and primary gathering areas (Unified Facilities Criteria
11.3.15.2 The location should be coordinated with the Postal Services.

11.3.15.3 If group mailboxes are required, provide central locations for them adjacent to hard-surface walkways but not to impede pedestrian movement.

11.3.16 Monuments, Memorials, and Military Equipment Static Displays.

11.3.16.1 Monuments and static displays should be carefully designed and placed in prominent locations to serve as visual focal points within the installation. Static displays of equipment should be consolidated in one location to create a central museum or exhibition facility within the installation.

11.3.16.2 Memorials will conform to the guidance set forth in Army Regulation (AR) 1-33, Memorial Programs.

11.3.17 Drinking Fountains.

Outdoor drinking fountains should not be provided, except to support larger playgrounds, outdoor recreation facility complexes, and outlying recreation areas if convenient to a potable water supply line. Steps should be provided for children and the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and Uniform Federal Accessibility Standards (UFAS) standards meet.

11.4 SIGNS

11.4.1 Signs are used to visually communicate information. They are highly visible features that should be attractive and compatible with their surroundings. Careful consideration must be given to what a sign says, how it is said, its visual appearance and organization, its location, structural support system, and relation to other signs within the installation. Standardized signage systems facilitate movement, provide a sense of orientation, and reinforce standards of excellence. Signage creates a unifying element throughout the installation that visually ties the installation themes together and builds a reference and continuity that translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type, and sizing is found in Technical Manual (TM) 5-807-10, Signage.
11.4.2 Sign System Characteristics. There are several basic design characteristics that, by serving to convey necessary information clearly and attractively, are an integral part of any successful signage system.

11.4.2.1 Simplicity. An effective strategy provides only needed information, avoids redundancy, and eliminates over-signing with resultant clutter and visual confusion. Sign messages must be clear, simple, and easy for motorists to process quickly.

11.4.2.2 Continuity. It is essential that the system be applied uniformly and consistently throughout the entire installation. The importance of consistent implementation extends from the larger issues of sign type and size down to accurate color continuity and matching typestyles.

11.4.2.3 Visibility. Sign location is a very important ingredient within the system. Signs must be located at significant decision points and oriented to provide clear sight lines for the intended user. Close coordination of locations with respect to landscaping, utilities, adjacent signage, and various other street design elements is important to ensure long-term maximum visibility.

11.4.2.4 Legibility. Sign typestyle, line spacing, color, and size all combine to create the crucial design characteristics of legibility. This aspect of sign design should take into consideration users such as motorists, pedestrians, or bicyclists, and the relative travel speed at which each type of user will be traveling when viewing the signs.

11.4.3 Vocabulary-Communications.

11.4.3.1 A common language has been created for establishing a signing system. The different components that create the sign package have been named and referred to within the total signing system.

11.4.3.2 The creation of a "signing language" helps generate a unified bond within sign types that make up a signing family.

- Reference
  - Information/Message
  - Presentation
  - Architectural Influence
11.4.4 Visual Hierarchy.

11.4.4.1 The entire signing system must communicate, through a range of sign and typestyle sizes, the relative importance of the individual activity that the sign identifies. The system should follow a logical progression from a point of origin to the desired destination.

11.4.4.2 A stated ranking method supports the visual standard of hierarchy within the signing system. Signs can be organized within assigned classes with emphasis on the function and image of the installation.

11.4.4.3 Within each class, the level of architectural influence evokes the importance of the sign to the installation. This is also critical to the idea of progression. The importance of a sign must be presented in its size and level of detail.

11.4.4.4 As individuals move closer to their destination on the installation, the scale of the sign becomes progressively smaller and the level of the message more detailed.

11.4.5 Types of Signs.

11.4.5.1 Information / Identification Signs.

These are signs that identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components (Fig. 11.X). They identify a location, and greet the visitor to that location. They should be compatible in scale and character with the architecture and also blend with the natural surroundings (Fig. 11.X). These signs are designed to include the following:

11.4.5.1.1 Typeface: Lettering is self-adhesive backing material.

- Building Title: Helvetica Medium, Upper and lower case
- Building Numbers: Helvetica regular
- Building Addresses: Helvetica Medium, Upper and lower case

11.4.5.1.2 Color:
11.4.5.1.3 Materials:

- Panel: Double-face 1/8” thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

11.4.5.1.4 Building Identification.

11.4.5.1.4.1 Street Addresses. The addressing procedures prescribed in DoD 4525.8-M, DoD Official Mail Manual are mandatory for use by all DoD components. DoD 4525.8-M, Chapter 3 prescribes the following:

All DoD address shall be assigned so they are compatible with the United States Postal Services automated delivery point sequencing (C3.3).

The DoD installation is responsible for assigning city-style, street address on the installation (C3.3.2.2).

Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee (C3.3.2.2.1).

Only geographically locatable civilian-style street address (such as 4102 Cindy Avenue, Fig. 11.X) shall be used (C3.3.2.2.4).

Installations shall not use one street address for the entire installation and then use secondary unit designators such as "Building 123" to designate the delivery addresses on the installation (C3.3.2.2.5).

Addresses such as "Building 123 Roberts Street" are not a valid address format and shall not be used (C3.3.2.2.6).

11.4.5.1.4.2 Address Placement.
Place addresses by the front entrance of the building so they can be seen (C3.3.2.3.1).

Place both the street name and address number on the building if both the building number and street address are visible from the street.

Building identification signs will use street addresses (Fig. 11.X).

Buildings without identification signs shall have the address number and street name centered above the main entrance or located to the right side (Fig. 11.X).

11.4.5.1.5 Housing Areas.

11.4.5.1.5.1 The sign should be complimentary to the architectural setting of the housing area and approved by the installation Real Property Planning Board.

11.4.5.1.5.2 Housing numbers should be placed on the curb in front of the respective house and on the house where lighting will effectively light the numbering.

11.4.5.1.6 Installation Identification Signs.

11.4.5.1.6.1 Installation identification signs name the installation and display the official US Army plaque (Fig. 11.X). The designation "United States Army" must appear at the top of the sign in accordance with AR 420-70, para 2-7h. Every installation entrance shall have an installation identification sign displaying only the US Army plaque, with the words "United States Army, Fort (Name of Fort), and gate name as indicated in "Figure 11.X - Installation Entrance Signs". The placement of Senior Mission Commander logo, unit crest, and other installation identification signs, monuments, or displays shall be located inside the installation beyond the cleared area of the Access Control Point (ACP) of entry. When used service-wide, these signs convey a uniform image of strength and stability to the public. Emblems, branch colors, unit mottos, names, and titles of individuals are not to be displayed.

11.4.5.1.6.2 Installation identification signs consist of three types:

- Sign type A1, main entrance sign, identifies the principal visitor entrance.
• Sign type A2, secondary entrance sign, identifies entry points with relatively high volumes of visitor traffic.

• Sign type A3, limited access entry gate signs, identifies entry points with limited public access.

11.4.5.1.6.3 See Technical Manual (TM) 5-807-10, Signage, paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

11.4.5.1.6 Street Signs.

Street name identification signs should be designed with the same lettering, color, and materials as other information signs (Fig. 11.X).

11.4.5.1.7 Wheeled Electrical Signs.

Wheeled electrical signs will have an attractive presentation. Temporary landscape elements should be used whenever possible. The siting of this type of sign will be approved by the RPPB. No sign of this type will be left in place for longer than six (6) months. After which time, the sign will be removed or turned into a permanent sign.

11.4.5.2 Directional Signs.

Place directional signs in central locations and at major decision points along circulation routes. These signs guide the motorist or pedestrian in, around, and out of the installation (Fig. 11.X). The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. Messages will be grouped in the following order according to their arrow direction: forward, left, and right. In addition, placement of the message on the sign panel is determined by the arrow direction. Destinations forward and left are listed first and have flush left messages. Destinations right are listed next and have flush right messages. The arrow is centered in the space between the message and the edge of the sign. Prioritize destinations to be listed by giving the highest priority to the destinations that are most often sought by people new to the garrison or that serve as highly visible landmarks on the garrison. Those who live or work on the garrison or who visit frequently do not need the degree of help required by a first time or infrequent visitor. These signs are designed to include the following:

11.4.5.2.1 **Typeface:** Lettering is self-adhesive backing material.
11.4.5.2.2 **Arrow:**

- Place at end indicating direction.
- Stoke width: Helvetica Medium cap

11.4.5.2.3 **Color:**

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

11.4.5.2.4 **Materials:**

- Panel: Double-face 1/8” thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

11.4.5.3 Regulatory Signs.

These signs provide the rules for travel and parking on the installation. They include speed signs, turning and lane use signs, warning signs, parking control signs, etc. (Fig. 11.X). Related to these signs are pavement markings and traffic signals. These signs are designed to include the following:

11.4.5.3.1 **Typeface:** Lettering is self-adhesive backing material.

- Helvetica Medium upper and lower case

11.4.5.3.2 **Color:**

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
• Exposed panel backs and edges: Dark Brown

• All paint: Semi gloss

11.4.5.3.3 **Materials:**

• Panel: Double-face 1/8” thick aluminum

• Post: Steel Pipe

• Foundation: Concrete pier or direct burial

11.4.5.3.4 Traffic Control Signs.

11.4.5.3.4.1 CONUS Installations. National highway standards will be used for signs to regulate vehicular traffic on CONUS installation ([AR 420-72, Transportation Infrastructure and Dams](#), Para 2-15f). These standards are described in the [Manual of Uniform Traffic Control Devices (MUTCD)](#). Also see [MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings](#). This pamphlet clarifies existing standards and provides definite guidelines for installation officials to conform to the MUTCD. These standards shall be used installation wide to include installation Access Control Points.

11.4.5.2.4.2 OCONUS Installations. OCONUS installation streets and roads are to be considered extensions of the road system of the host nation and shall use traffic control device standards and criteria of the host nation ([AR 420-72, Transportation Infrastructure and Dams](#), Para 2-15e).

11.4.5.3.5 Prohibitory (Warning) Signs. This category of signage is intended to maintain security and safety on the installation perimeter and at other specific secure areas. These signs notify visitors of restrictions, as well as other security procedures. The guidelines for design, fabrication, and placement of warning signs are found in [Technical Manual (TM) 5-807-10, Signage](#), para 3-9.

11.4.6 Electronic Exterior Signs

All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited.
11.4.7 Sign Placement

Placement of signs differs according to the type of sign and the specific site constraints. The following guidelines apply to placement of the majority of signs.

Do not place more than one sign at any location. Traffic rules are the exception to this rule (Fig. 11.X).

Place signs in areas free of visual clutter and landscape materials.

Place signs in locations that allow enough time for the user to read and react to the message.

Signs should not be placed to block sight lines at intersections.

Place signs approximately 1.2 meters (4 feet) above ground level to be within 10 degrees the driver's line of vision (Fig 11.X). Provide proper placement to avoid a hazard to children.

11.4.8 Sign System Typography.

11.4.8.1 Military Emblems. The Army has a rich tradition of military heraldry. Military emblems are an important part of the soldiers' identity and the emblems have been carefully crafted over the years to express unit pride and unique history and function of the unit. The care and use of organizational emblems in a signage system can add visual interest as well as build pride and a sense of history. However, the overuse of miscellaneous emblems can lead to clutter and a dilution of their importance. Colors for military emblems must be in accordance with the Institute of Heraldry.

11.4.8.2 Department of the Army Plaque. The plaque should be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be in accordance with Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques, and must be reproduced in full color.

11.4.8.3 Insignias. The use of branch insignia, shoulder sleeve insignia, coat of arms and/or distinctive insignia on headquarters signs is permitted. All military emblems must appear in full color. Motivational symbols or motifs will not be used.
11.4.9  Reduce Visual Clutter.

11.4.9.1  Over-signing detracts from a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

11.4.9.2  Clutter creates confusion and ineffectiveness. Often motorist and pedestrians are confused by the bombardment of messages that have no relationship to each other, or the communication is on such a minimal level that the sign serves no purpose.

11.4.10  Location Maps.

11.4.10.1  The location map is an integral element of an installation entrance. The location map display provides information and sense of place to the viewer. The design and construction should be of compatible architectural materials found throughout the installation.

11.4.10.2  The location map should contain the following characteristics within the design.

- Plexiglas covered map for protection
- Architectural compatible materials used for the base
- Paved walk-up area
- Litter receptacle
- Provide parking adjacent
- Provide current takeaway maps

11.5  LIGHTING

*Installation: Adjust entries to meet your particular installation lighting system: fixtures and lighting styles.*

11.5.1  Lighting is a functional requirement of installations that also impacts the visual environment. The installation lighting system conveys a sense of order and organization. There are five primary types of lighting on military installations. They are:

- Roadway Lighting
- Pedestrian Lighting
• Parking Lot Lighting
• Outdoor Architectural Lighting
• Security Lighting

11.5.2 The primary visual problem that exists with exterior lighting on most military installations has been the lack of overall coordination of a lighting system.

11.5.3 A lighting system provides the proper type of lighting for different lighting requirements and locations. A system is composed of six primary components – fixtures, light height, type of pole, light spacing, type of lamp, and level of intensity of lamp.

11.5.4 The proper type of lighting for various locations is shown in the Figure 11-X matrix. (Fig. 11.X – Lighting Design Matrix

**Installation: Complete the matrix as applicable.**

11.5.5 All lighting should be located or designed to prevent undesirable spillover of light into other areas. Spotlights in particular should be aimed or screened to prevent glare that could blind motorists or pedestrians or light sleeping areas.
## Table 11.X Light Design Matrix

<table>
<thead>
<tr>
<th>LIGHT DESIGN MATRIX</th>
<th>TYPICAL AREAS OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incandescent</td>
<td>•</td>
</tr>
<tr>
<td>Halogen</td>
<td>•</td>
</tr>
<tr>
<td>Mercury Vapor</td>
<td>•</td>
</tr>
<tr>
<td>Florescent</td>
<td></td>
</tr>
<tr>
<td>Metal Halide</td>
<td>•</td>
</tr>
<tr>
<td>High Pressure Sodium</td>
<td>•</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LAMP</th>
<th>LEVEL</th>
<th>FOOT-CANDLES (FC)</th>
<th>LUX (LX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lux (lx)</td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Foot-candles (fc)</td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>FIXTURE</th>
<th>POLE</th>
<th>SPACED</th>
</tr>
</thead>
<tbody>
<tr>
<td>40' Max</td>
<td>Cutoff</td>
<td>Metal</td>
<td>120' Max</td>
</tr>
<tr>
<td>25' Max</td>
<td>Utility</td>
<td>Metal</td>
<td>90' Max</td>
</tr>
<tr>
<td>15' Max</td>
<td>Bollard</td>
<td>Wood</td>
<td>Varies</td>
</tr>
<tr>
<td>Varies</td>
<td>Spot</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
11.5.6 Light Fixtures.

11.5.6.1 A lighting fixture is the frame or housing for holding the lamp in position and for protecting it from damage. Light fixtures should be selected and located to maintain the minimum foot-candle requirements for safety and security purposes. Beyond that, aesthetic considerations should take precedence.

11.5.6.2 Lighting fixtures are grouped into five general categories as defined below. Figure 11.X includes examples of four of the categories.

11.5.6.2.1 Cutoff Lighting.

Refers to the large shoebox-shaped fixtures placed on tall poles and used to illuminate streets and parking lots. They are designed to cut off light traveling to the top and sides of the fixtures, concentrating it down onto the parking lot. The fixtures reduce the spillover of light where it is not wanted.

11.5.6.2.2 Utility Lighting.

Refers to simple, inexpensive fixtures that are used in industrial areas of low visibility.

11.5.6.2.3 Bollard Lighting.

Refers to fixtures that are mounted on or in a short post to illuminate pedestrian areas. They can also be used as physical barriers between pedestrian and vehicular traffic.

11.5.6.2.4 Spotlighting.

Refers to high intensity fixtures that concentrate light into a narrow beam and are used to highlight signs and other important objects. Spotlights should be screened by landscaping or other methods so they are inconspicuous during the day.

11.5.6.2.5 Wall-Mounted Lighting.

Refers to fixtures attached to the wall of a building or a wall bordering a walkway or stairway.

11.5.7 Light Poles

11.5.7.1 The light fixture size should be proportional to the intended pole height.
11.5.7.2 **Installation:** Specify the installation light pole standards.

11.5.8 Light Fixtures and Poles.

Light poles should be consistent and provide uniformity throughout the installation. The pole height shall be determined by their intended function as shown below (Fig. 11.X).

11.5.9 Lamp Characteristics.

Selection of a lamp involves evaluating its optical control, efficiency, lamp color rendition, lamp life, cost, and maintenance. The following is a summary of the characteristics of typical lamp types. Recommended locations for the six types are included in Figure 11.X.

11.5.9.1 Incandescent

- Superior color rendition
- Inexpensive
- Good optical control
- Short life span
- Lowest efficiency

11.5.9.2 High Pressure Sodium

- Poor color rendition
- Broad application
- Low maintenance
- Superior optical control
- Superior life span
- Excellent efficiency
- Expensive

11.5.9.3 Low Pressure Sodium

- Poor color rendition
• Good efficiency
• Superior life span
• Expensive

11.5.9.4 Fluorescent
• Good color rendition
• Poor optical control
• Good life span
• Good efficiency in mild climates
• Produces glare

11.5.9.5 Metal Halide
• Superior color rendition
• Superior optical control
• Efficiency better than mercury vapor but poorer than pressure sodium.
• Expensive

11.5.9.6 Mercury Vapor
• Good color rendition
• Good foliage lighting
• Good life span
• Good efficiency
• Inexpensive

11.6 UTILITIES

11.6.1 Utility systems provide the basic infrastructure of power, communication, water, and sewer services necessary for the operation of the installation. Utilities play a key role in the visual quality on an installation. Their primary impact on the visual...
quality is the result of the clutter of overhead utility lines and poorly designed storm drainage systems.

11.6.2 The visual and environmental impact of utilities should be minimized on the installation (Fig. 11.X). Also, the systems should be designed to minimize maintenance and repair. The result is a more sustainable utility system that will promote the overall sustainability of the installation. The primary components of the utility system and recommendations for their location and design are included below.

11.6.3 Overhead Transmission Lines

11.6.3.1 Unsightly overhead utilities should be relocated underground wherever possible to reduce negative visual impacts, and reduce maintenance and repair requirements. Underground utilities are also desirable for protection from terrorist or other enemy attack. When underground locations are not possible, the negative visual impacts should be minimized by using the following design techniques:

11.6.3.2 Overhead Transmission Lines Location.

Overhead transmission lines should be aligned along edges of land use areas to avoid dividing an area and creating gaps or unusable areas. They should conform to natural landforms that can be utilized to screen them from public view. Hills should be crossed obliquely rather than at right angles. Alignments along hillcrests or steep grades should be avoided.

11.6.3.2 View Screening.

Minimize long views or silhouette views of overhead transmission lines from along roads and other public viewing areas. Avoid the “tunnel effect” of long, straight, uninterrupted views along the alignment by clearing vegetation only within the right-of-way that threatens the overhead lines. Jog the alignment at road crossings and periodically undulate and feature plant materials along the edges of the right-of-way.

11.6.4 Distribution Lines.

Power distribution lines should also be located underground to minimize negative visual impact, reduce maintenance, and protect from terrorist or other enemy attack. If overhead, they should be located out of view from main public visibility areas or screened to be as unobtrusive as possible (Fig. 11.X and Fig. 11.X). Avoid
alignments of overhead lines along major circulation corridors. Use minor streets, alleyways, rear lot lines, and vegetation or topography that provide screening and minimize visual impact. Minimize the number of poles and pole height, and use poles that blend into their surroundings to reduce visual impact. Poles should also be multi-functional for power, telephone, cable television, street lighting, etc., to reduce visual clutter.

11.6.5 Substations and Transformers.

Substations and transformers should be designed and located to minimize their visual impact and be compatible with the character of their setting. Substations are best located in industrial use areas rather than in major public circulation areas. They should be screened from public view by using plant material, berms, and walls.

11.6.6 Sewer and Water.

11.6.6.1 All sewer and water lines should be underground.

11.6.6.2 Sewage treatment facilities should be located 1,250 ft. (0.38 Km) distance and in a downwind direction from all inhabited facilities.

11.6.6.2 Treatment facilities should be screened from view of major roads and other installation facilities by plant material, berms, walls, and fences.

11.6.6.3 A water storage tank that has visual strength in its form can be used as a focal point or identifying landmark that can provide a sense of orientation within the installation.

11.6.6.4 Fire hydrants should be highly visible and free of any screening. They shall be nutmeg brown in color with luminous paint. Caps shall indicate tested water pressure (Fig. 11.X).

11.6.7 Storm Drainage

11.6.7.1 Installation storm drainage systems should be appropriate to the character of development they serve. Storm drainage systems in densely developed areas require curbs, gutters, and underground lines. Storm drainage systems in low-density areas can utilize drainage swales and ditches that are contoured to be compatible with the natural landform. Where retention ponds are required, they should be designed to appear as a natural amenity that is part of the natural contour of the land, rather than a
square or rectangular hole in the ground. Retention ponds that are designed to be dry most of the time can be utilized for recreational purposes or as open space. In either case, the areas should be designed to conform to the natural contours of the land.

11.6.7.2 Large hard surfaced parking lots should have covered drainage at the entry to prevent water draining into adjacent streets.

11.7 ARMY STANDARDS

11.7.1 The cited Army Standards shall be met.

- DoD 4525.8-M, DoD Official Mail Manual
- Army Regulation (AR) 420-49, Utility Services
- Army Regulation (AR) 420-70, Buildings and Structures
- Army Regulation (AR) 420-72, Transportation Infrastructure and Dams
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)
- Technical Manual (TM) 5-807-10, Signage
- Manual of Uniform Traffic Control Devices (MUTCD)
- MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings
- Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings

11.8 REFERENCES

11.8.1 The following references are provided for guidance.

- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chap 11
- Unified Facilities Criteria (UFC) 3-210-04, Design: Children's Outdoor Play Areas
• Army Regulation (AR) 1-33, Memorial Programs

• Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques

• Technical Manual (TM) 5-663, Child Development Center, Play Area Inspection and Maintenance Program

• Technical Manual (TM) 5-803-5, Installation Design Manual
Installations - Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation to meet Army standards.

12.1 INTRODUCTION

12.1.1 Accommodating the need for security and antiterrorism is a significant concern for all military facilities design. The security and antiterrorism requirements must be integrated into the total project. Design of protective elements should seek to visually enhance and complement the design of a facility. Site elements such as fences, courtyards, screen walls, swales, berms, planters, and retaining walls can be used effectively for facility protection. These design elements should be designed to provide visual harmony with the main facility, producing architectural compatibility through consistent use and application of materials, forms, and colors.

12.1.2 Final design decisions to meet security and antiterrorism requirements and resolve conflicts will require coordination among the design disciplines and appropriate functional areas to include land planners, landscape architects, architects, intelligence personnel, security personnel, Force Protection Officer, facility users, and engineers. The designers must work to balance force protection requirements with all other requirements that impact design and development. These include the Americans with Disabilities Act Accessibility Guidelines (ADAAG), the Uniform Federal Accessibility Standards (UFAS), National Fire Protection
Codes (NFPA), and all applicable local building codes and ordinances. The design team will also consult security personnel to determine whether portions of the design documents are subject to access limitations.

12.2 BUILDING SITING AND DESIGN STANDARDS

12.2.1 A primary concern for Army installations throughout the world is the threat of terrorist attack. To minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live DoD has developed the Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings.

12.2.1.1 UFC 4-010-01 establishes the minimum building antiterrorism standards for all DoD components.

- Mandatory DoD minimum antiterrorism standards for new and existing inhabited buildings are contained in Appendix B.

- Mandatory DoD minimum antiterrorism standards for expeditionary and temporary structures are contained in Appendix D.

- Additional recommended measures for new and existing, inhabited buildings are contained in Appendix C.

Implementation of the mandatory standards is obligatory for all new construction regardless of the funding source. These standards apply to FY 2004, and all subsequent fiscal years, for projects involving new construction and major renovations for inhabited structures. The standards will be reviewed before any site planning or design is initiated.

12.2.1.2 Minimum Standoff Distances and Separation for Buildings:

- The minimum standoff distances and separation for new and existing buildings are found in Table B-1 of UFC 4-010-01.

- The minimum standoff distances and separation for expeditionary and temporary structures are found in Table D-1 of UFC 4-010-01.
12.2.1.3 The DoD minimum standards, when applicable, may be supplemented by more stringent force protection building standards to meet specific threats inherent in the geographical area where the facility is to be constructed. Those additional requirements may be established by either standards for specific Combatant Commanders or based on Risk and/or Threat Analysis.

12.2.1.4 When the minimum standoff distances can not be achieved because land is unavailable, the standards allow for building hardening to mitigate blast effects. Costs and requirements for building hardening will be are addressed in the DoD Security Engineering Manual. (See para 12.2.2 below for information regarding the DoD Security Engineering Manual).


12.2.2.1 Website Access for Military and Government Users. This is a password protected website. To enter the site you must be accessing the site from either a ".mil" or ".gov" address. Upon initial entry, you will be prompted with instructions on how to acquire your password.

12.2.2.2 Website Access for Non Military and Government Users. Currently, the Protective Design Center is developing a procedure for e-mailing the network administrator to receive procedures to enter the site. If upon initial entry into the site there are no instructions on this procedures, contact the Protective Design Center (CENWO-ED-S) at (402) 221-3151 for instructions.

12.2.3 Orientation of Buildings on a Site. The following will be given consideration when determining the orientation of a building.

12.2.3.1 Deny aggressors a clear "line of sight" to the facility from on or off the installation where possible. Protect the facility against surveillance by locating the protected facility outside of the range or out of the view of vantage points.

12.2.3.2 Protect against attack by selecting perimeter barriers to block sightlines such as obstruction screens, trees, or shrubs. Non-critical structures or other natural or man-made features can be used to block sightlines.
12.2.3.3 Create "defensible space" by positioning facilities to permit building occupants and police to clearly monitor adjacent areas.

12.2.3.4 If roads are nearby, orient building so there are no sides parallel to vehicle approach routes.

12.2.3.5 Design vehicular flow to minimize vehicle bomb threats, avoid high-speed approach into any critical or vulnerable area.

12.2.3.6 Avoid siting the facility adjacent to high surrounding terrain, which provides easy viewing of the facility from nearby non-military facilities.

12.3 FENCING

12.3.1 Fences are used as protective measures against project-specific threats. They are most appropriately used to define boundaries and to deter penetration of a secure area (Fig. 12.X). A fence will assist in controlling and screening authorized access to a secured area. Fences also serve the purposes listed below.

12.3.1.1 As a platform for the Intrusion Detection System.

12.3.1.2 As a screen against explosive projectiles.

12.3.1.3 To stop moving vehicles if they are reinforced to do so.

12.3.2 Plants with tall growth habits and/or large mature growth will be located well away from security fences.

12.4 LANDSCAPE CONSIDERATIONS

12.4.1 Landscaping guidelines for buildings should not be ignored because of standoff distances. The landscape design should enhance the overall attractiveness of the facility while still providing or enhancing the objective level of security level of security.

12.4.2 Establish clear zones along both sides of security fencing. Vegetation in the clear zone should not exceed four inches in height. (DoD 0-2000.12-H, Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence, Appendix EE, Table EE-4).

12.4.3 Strategically locate trees and planters to prevent penetration of an attack vehicle into the secure area perimeter.
12.4.4 Vegetative groupings and earth sheltering berms provide inherent blast effect reduction from external blast forces.

12.4.5 Plant material that can provide concealment will not be used adjacent to high security structures or fence lines.

12.4.6 Use dense, thorn-bearing plant material to create natural barriers to deter aggressors.

12.4.7 Screen play and outdoor recreation areas from public (off-installation) view.

12.4.8 Designers need to balance the need for signs that identify, locate, and direct residents and supported personnel to installation assets, versus the need to discourage and frustrate hostile intelligence gathering and access. One method of achieving this balance could be to direct people to a community support or information center to obtain directions to high security activities. Another could be "All incoming personnel and visitors report to building number ________________".

12.4.9 Place trash containers as far away from the facility as possible. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas ([Unified Facilities Criteria [UFC] 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#), Table B-1).

12.4.10 Unobstructed Space. Ensure that vegetation and site features within 10 meters (33 feet) of inhabited buildings do not conceal form observation objects of 150mm (6 inches) in height. ([UFC 4-010-01, Appendix B, Para B-1.3](#)). This does not preclude landscaping within the unobstructed space, but it will affect the design and may affect plant selection.

### 12.5 LIGHTING

Lighting systems for security operations provide illumination for visual and closed-circuit television (CCTV) surveillance of boundaries, sensitive inner areas, and entry points. When CCTV is used as part of security operations, the lighting system will be coordinated with the CCTV system. The specific installation environment and the intended use determines lighting system requirements. Often two or more types of lighting systems are used within a single area (Fig. 12.X). Guidance on the use of security

![Fig. 12.X – Lighting creates a deterrent](#)
lighting may be obtained from **TM 5-811-1, Electrical Power Supply and Distribution**.

### 12.6 BERMS

12.6.1 Use of berms for force protection can fulfill one of the following functions (Fig. 12.X).

- Define boundaries of property or boundary limits.
- Provide a barrier to moving vehicles.
- Hinder pedestrian movement.
- Intercept projectiles.
- Obstruct lines of sight.

12.6.2 Berms used to block lines of sight or projectiles must be high enough to achieve those objectives or may be combined with landscaping or other construction elements. Detailed design guidance is contained in Army Technical Manual (TM) 5-853-3/AFMAN 32-1071, Vol. 3, *Security Engineering Final Design*.

**NOTE**: This Army Technical Manual is a "For Official Use Only" document and is not accessible on the Army Corps of Engineers publications website. A copy of the manual can be acquired by ordering it through your standard publications account.

### 12.7 GATES AND ENTRANCES (ACCESS CONTROL POINTS [ACP])

12.7.1 Installation entry points are key components in the force protection security program. The most effective entrances accommodate the functions of observation, detection, inspection, access control, and disablement of hostile personnel and vehicles, while containing the vehicles and pedestrians until access is granted. These areas are one of the most important installation features in the creation of a sense of arrival for both installation personnel and visitors. It is important that these areas present a positive public image (Fig. 12.X).

12.7.2 The Headquarters Department of the Army, Deputy Chief of Staff for Operations and Plans, DAMO-ODL, office in coordination with the Protective Design and Electronic Security Centers of Expertise are currently developing standards for Army Access Control Points (ACP). These standards will be published in
the near future. Contact number for the current status of the Access Control Point standards is (703) 693-2906.

12.7.2.1 Canopies for ACPs. ACPs will have a canopy, which will cover the full width of incoming lanes at the Guard Booth. The canopy shall have a minimum clearance of 14.5 feet and shall have a minimum length of 50 feet. Supporting structure of roof will consist of columns sized and located to create peripheral vision for the guards with minimal obstructions. Lighting will provide a minimum of 10 ft-candles with a Color Rendition Index of 65. Measures will be taken to protect the canopy from the threat of an over-height vehicle.


12.7.3 Physical Security Equipment.

12.7.3.1 The Product Manager, Physical Security Equipment (PM-PSE) under DoD Directive 3324.3 is assigned the mission of developing, fielding, and supporting Physical Security Equipment (PSE) throughout its life cycle for the Army, Joint Services, and other Government agencies.

12.7.3.2 The DoD Directive assigns specific areas of responsibility which include: interior PSE, Command and Control Systems, security lighting, force protection systems, barrier and systems, and interior and exterior robotics. The PM-PSE homepage and the DA-approved equipment Blank Purchase Agreements (BPAs) are listed below.

- [Product Manager - Physical Security Equipment Homepage](#)
- [DA-approved PSE Equipment Blanket Purchase Agreements (BPAs)](#)

12.8 INSTALLATION: ENTER PARAGRAPHS PERTAINING TO AREA SPECIFIC STANDARDS.

12.9 ARMY STANDARDS

12.9.1 The cited Army Standards shall be met.

- [Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
• Unified Facilities Criteria (UFC) 4-010-10, DoD Minimum Antiterrorism Standoff Distances for Buildings. (This document is a "For Official Use Only (FOUO)" publication. Users may contact the Point of Contact posted at the noted website for inquiries regarding this document).

• Uniform Federal Accessibility Standards (UFAS)

• Americans with Disabilities Act Accessibility Guideline (ADAAG)

• DoD Instruction 2000.16, DoD Antiterrorism Standards

12.10 REFERENCES

12.10.1 The following references are provided for guidance.

• Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chap 12

• DoD Handbook 2000.12-H, Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence, February 1993 (This Handbook is a "For Official Use Only (FOUO)" publication. Users may contact the Point of Contact posted at the following website to obtain a copy of the Handbook). http://www.dtic.mil/whs/directives/corres/html/o200012h.htm

• Army Regulation (AR) 525-13, The Army Force Protection Program (Available only through the Army Knowledge Online web portal).

• UFC 4-010-02, DoD Security Engineering Manual, (This document is in draft form. See the Security Engineering Working Group website.

• U.S. Air Force, Installation Force Protection Guide: (Contains information on installation planning, engineering design, and construction techniques that will preclude or minimize the effect of a terrorist attack).

• Technical Manuals/Air Force Manual series TM 5-853/AFMAN) 32-1071, Security Engineering, 3 volume series: (Volumes 2 and 3 are "For Official Use
Only [FOUO]" and are not available on the Army Corps of Engineers publications website. A copy of the manuals can be acquired via your standard publications account. The three volumes cover, Project Development, Concept Design, and Final Design respectively).
A.1 A completed Design Team Installation Design Guide (IDG) Checklist should be completed for all projects that impact the appearance of an Army Installation. The Master Planner shall provide the checklist to all teams designing new facilities, additions, or renovations to existing facilities, or maintenance on the installation. The Design Team IDG Design Checklist is to be completed by the design team to assure the guidelines and standards have been considered and complied with in the design process, and by the Master Planner in project review.

A.2 The Designer of Record or Design Agent will provide a copy of the completed checklist, together with a signed certification statement with each design submittal (10% [pre-concept], 35%, 60%, and 90% for each MILCON projects). The Designer of Record will complete the checklist and verify compliance in the space provided. In the case of Design Build, all agents i.e. the Corps of Engineers, NAF, AFFES, Host Nation, tenants, etc. shall have the perspective design build contractors submit a completed IDG Checklist as part of their proposal. The completed checklist will be provided to the Master Planner for review with concurrence or denial. Upon a determination of concurrence by the Master Planner, the plan and checklist with signatures will then be provided to the Real Property Planning Board for final acceptance or denial. The accepted checklist will become a part of the project record files.

A.3 If plans are denied for non-compliance at the installation or command level (where applicable) of review, an explanation of the denial will be provided to the Designer of Record. The plan and checklist can be resubmitted with revisions as indicated in the explanation of denial.
A.4 ARMY INSTALLATION DESIGN GUIDE (IDG) COMPLIANCE CHECKLIST

1. PROJECT TITLE AND DESCRIPTION.

Title: ........................................................................................................................

Description: ..............................................................................................................

2. PROJECT JUSTIFICATION: ..................................................................................

3. SUSTAINABLE DESIGN:

a. Has SPiRiT Checklist been attached? (If not, obtain completed checklist)

b. Does SPiRiT meet or exceed Silver level? ("Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18, 2003). For all other FY06 and future-year MILCON projects the minimum SPiRiT rating requirement is "Gold").

   Yes ______ - Review project as submitted.
   No ______ - Return submittal to design team for revisions to meet SPiRiT.

4. SITE PLANNING

a. Was a site plan prepared for the proposed project utilizing the IDG Design Process included in Sections 2, 3 and 5 of the IDG?

   Yes ______  No ______

b. Does the site plan include Site Planning Design Component guidelines of the IDG?

   Yes ______  No ______

c. Does the site plan meet AT/FP requirements identified in Section 12 of the IDG?

   Yes ______  No ______

d. Designer Comments on Site Planning:

   ..............................................................................................................................
   ..............................................................................................................................
e. Does Site Planning comply with the IDG? If not, provide justification.


f. Does Site Planning meet approved installation master plan siting compliance?
Yes _____ No _____ If not, provide justification.


g. Has NEPA been initiated for the construction effort in accordance with AR 200-2?
Yes _____ No _____

h. Has airspace criteria been consider relative to airfield accident potential zones?
Yes _____ No _____

5. BUILDINGS

a. Does the building exterior design meet the Building Design objectives defined in the IDG?
Yes _____ No _____

b. Is the exterior building designed to meet the Structural Characteristics defined in the IDG?
Yes _____ No _____

c. If the project is a renovation or addition, does the proposed renovation or addition meet IDG building design and structural characteristics?
Yes _____ No _____

d. If the project is a renovation or addition to a historic building, does the renovation or addition maintain the design integrity of the original building or meet Historical Approval Agencies' requirements for any deviations?
Yes _____ No _____

e. Does the building exterior design meet AT/FP requirements (if applicable)?
Yes _____ No _____
6. Circulation

a. If the project includes roadway construction, does the proposed plan meet Federal Highway and/or local guidelines defined in the IDG?
   Yes _____  No _____

b. If the project includes roadway construction, does the proposed plan meet AT/FP roadway setback requirements defined in the IDG?
   Yes _____  No _____

c. If the project includes roadway construction, does the proposed plan include applicable roadway alignment and intersection guidelines defined in the IDG?
   Yes _____  No _____

d. If the project is an entrance gate, does the proposed plan include entrance gate guidelines and standards defined in the IDG?
   Yes _____  No _____

e. If the project includes parking, does the proposed plan meet the Parking Lot Location/Design guidelines defined in the IDG?
   Yes _____  No _____

f. If the project includes pedestrian circulation, does the proposed plan meet the Walkways and Pedestrian Circulation Guidelines in the IDG?
   Yes _____  No _____

g. If the project includes bicycle circulation, does the proposed plan meet the Bikeway Guidelines in the IDG?
   Yes _____  No _____
h. Designer Comments on Circulation Design:


i. Does Circulation Design comply with the IDG? If not, provide justification.


7. PLANT MATERIAL

a. All projects for new construction should include the planting of trees shrubs and/or groundcover. Does the proposed planting plan include a project plan?

   Yes _____   No _____

c. Does the proposed planting plan meet AT/FP requirements defined in the IDG?

   Yes _____   No _____

d. Does the proposed planting plan include plant material recommended in the selected Plant Palette Matrix included in the IDG?

   Yes _____   No _____

e. Designer Comments on Landscape Design:


f. Does Landscape Design comply with the IDG? If not, provide justification.


8. SITE ELEMENTS

a. If the project includes Site Furnishings, does the proposed plan follow the guidelines in the IDG?

   Yes _____   No _____
b. If the project includes Signs, does the proposed plan meet the Signs standards in the?

Yes _____ No _____

c. If the project includes exterior Lighting, does the proposed plan meet the exterior Lighting guidelines defined in the IDG?

Yes _____ No _____

d. Will all power and other distribution lines to be located underground?

Yes _____ No _____

e. Will all substations and transformers be designed as to be screened from view?

Yes _____ No _____

f. Will all sewer and water lines to be located underground?

Yes _____ No _____

g. Are all storm drain systems designed to meet the guidelines defined in the IDG?

Yes _____ No _____

h. Designer Comments on Site Elements Design:

__________________________________________________________________________________

__________________________________________________________________________________

i. Does Site Elements Design comply with IDG? If not, provide justification.

__________________________________________________________________________________

__________________________________________________________________________________

9. ANTITERRORISM (SECURITY)

a. Have installation boundary setbacks been included?

Yes _____ No _____

b. Have building setbacks from roads, parking, other buildings been included?

Yes _____ No _____
c. Do site plans and landscape plans include the criteria outlined for AT/FP?

Yes _____  No _____

d. Designer Comments on AT/FP Compliance:

________________________________________________________________________

________________________________________________________________________

e. Does AT/FP Design comply with the IDG? If not, provide justification.

________________________________________________________________________

________________________________________________________________________

I hereby certify that the information provided is in compliance with the guidelines of the installation or applicable IDG, except as justified as non-compliance.

________________________________________________________________________

Designer of Record ___________________________ Date __________

Concur _________  Deny _________, Explanation of denial is attached.

________________________________________________________________________

IDG Coordinator ___________________________ Date __________

Accept _________  Deny _________, Explanation of denial is attached.

________________________________________________________________________

Command Review (Where Applicable) ___________________________ Date __________
**Installations** - Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation to meet Army standards.

B.1 The following checklist is optional and is designed for use on major projects.
PROJECT REQUIREMENTS CHECKLIST

For Completion by Installation Personnel for Use in Preparation of the Request for Proposals (RFP).

PROJECT __________________________ LOCATION __________________________

DPW/DIS POC __________________ PH# __________________

ADDRESS: ________________________________

E-MAIL ________________________________

DATE CHECKLIST COMPLETED ____________ BY __________________________

When completing this form it is important to remember that it is the responsibility of the installation to resolve any conflicts between the different “users” (i.e. DPCA, DPW, etc.) about wants, needs, etc. The A/E that prepares the RFP must have the specific guidance contained herein to get you what you want. If there is information you wish to provide that is not specifically requested or you are unable to make your desires clear within the confines of this checklist, then add those comments at the end. Overseas installations consider compliance with Host Nation codes.

1.0 GENERAL INFORMATION

A. Maps and plans available: (Provide copies with completed checklist)

1. Basic Information Maps (BIMs): (List Drawing Numbers)

   (Maps should be provided in Spatial Data Standards (SDS) compatible GIS format whenever possible.)

   Site topography
   Site Sanitary Sewer
   Site Storm Sewer
   Site Electrical
   Site Water
   Site Plan Extract - from RPMP (Future Development Site Plan)
   Other
   Project Location Plans
   Area Map
       a) Site Map

2. Aerial Photograph (Preferred to Topographic)

3. USGS Map
4. Project Siting Plan (Proposed)

5. Environmental
   a) Jurisdictional wetlands designation
   b) Other historical concerns:

B. Project Building Plans: (If renovation/addition or prior design, provide available information and plans)

1. Foundation 7. Electrical
2. Basement 8. Mechanical
3. Floor 9. Plumbing
4. Structural 10. Site Utilities
5. Roof 11. Specifications
6. Elevations 12. Other

C. Applicable Codes and Standards:

List all known applicable codes and regulations. Generally, NAF construction will not follow Federal or Military Specifications.

Department of Defense (DoD) Governing criteria is UFC 1-200-01, Design: General Building Requirements, 31 July 2002

Local Building Codes:

State and County Codes:

Environmental Regulations:

Installation Regulations:

Cultural Regulations:

Other:

1.1 TEMPORARY FACILITIES AVAILABLE TO THE CONTRACTOR

A. Facilities available to contractor during construction:

1. General Site Plan has been annotated to show limits of construction site: Yes, No. If the contractor requires the use of additional area, he must obtain written approval from the Contracting Officer.

2. Construction Office available: Yes, No.


NOTE: Security of construction site and materials is the Contractor’s responsibility.

5. Select fill borrow areas, spoil areas, sanitary fill and haul routes are shown on attached Installation map: Yes, No.

List any restrictions or notes on the use of those areas:

NOTE: Disposition of scrap and salvageable materials resulting from construction is the responsibility of the contractor unless otherwise noted and agreed.

B. Utilities available to contractor during construction:

1. Potable Water: Yes, No; Metering required: Yes, No;
   Cost $ per .

2. Non-Potable Water (Irrigation, Machine Washing, etc.): Yes, No;
   Metering required: Yes, No; Cost per .

3. Electricity: Yes, No; Metering required: Yes, No;
   Cost $ per .

4. Natural gas: Yes, No; Metering required: Yes, No;
   Cost $ per .

5. Sanitary sewer: Yes, No

NOTE: Utilities used at the construction may be metered and/or charged to the contractor. The rate schedule for utilities will be provided as part of this completed checklist and shall be the basis by which the installation will bill the
utility usage. Installation of temporary meters, where required, and temporary tie-ins to the utility systems shall be the responsibility and at the cost of the contractor.

1.2 DEMOLITION REQUIREMENTS

Facilities for demolition, relocation, or retention.

Provide description, size, type construction, and location of any existing facilities on the site that must be demolished, relocated or retained. Consider all structures, foundations, pavements, communications, and utilities (whether active or abandoned). Consider demolition hazards (i.e. lead, asbestos, etc.). Every effort shall be made by the installation to ensure compliance with the clean site policy. Provide the date when the clean site will be available. Recycle building demolition and debris material when ever possible.

1.3 PAVING REQUIREMENTS

A. Parking area (s) required: ____Yes, _____No.

1. Location and brief description:

2. Number of parking spaces for passenger vehicles: ____________________________
   (including _____ spaces for the handicapped).

3. Type of pavement: ______________________________________________________

4. Perimeter of parking area (s) to have concrete curb: _____Yes, _____No.

5. Striping of parking spaces required: _____Yes, _____No.
   a) Width of stripes: ______________________________________________________
   b) Type of paint to be used: _____________________________________________

1. Special signage required: _______________________________________________

2. Concrete wheel stops required: _____Yes, _____No.

3. Handicapped ramps/depressed curbs required: _____Yes, _____No.

B. Service road (s) required: _____Yes, _____No.

1. Location: ______________________________________________________________

2. Type pavement: _________________________________________________________

3. Concrete curbing required on both sides of road: _____Yes, _No.
4. Minimum roadway width: ___________ Feet ______________.

List any other special paving considerations or needs: ________________

__________________________________________________________________

__________________________________________________________________

C. Sidewalks required: _____ Yes, _____ No.

   1. Type of paving material: ________________________________

   2. Location: ________________________________

   3. Minimum width: ________________________________

   4. Minimum thickness shall be 4” with welded wire fabric.

D. Concrete dumpster pads required: _____ Yes, _____ No.

   1. Number of pad (s): ________________ each. See note below.

   2. Size of each pad: _______ feet by _______ feet.

   3. Provide bumper stops at rear of pads: _____ Yes, _____ No.

   4. Provide architectural screening of pads: _____ Yes, _____ No.

      Type: ________________________________

   NOTE: Building orientation or design may eliminate need for screening. Screening shall be in accordance with the Army Installation Design Guide (IDG).

1.4 UTILITIES SERVICE REQUIREMENTS

A. Electrical Service: Meter required: _____ Yes, _____ No,

   Type: ________________________________

   1. Type system to be installed: _______ underground, _______ aerial.

   2. Type transformer (s) to be installed: _______ Pole mtd., _______ Pad mtd.,

   NOTE: Screen in accordance with Army Installation Design Guide (IDG).

   3. Available Voltage: ________________________________
4. **Location of tie-in point:**

**B. Water Service:**

- **Meter required:** _____Yes, _____No.
  
  1. Size and location of tie-in point: ____________________________
  
  2. Additional fire hydrant(s) required: __________________________

**C. Sanitary Sewer Service:**

- Size and location of tie-in point: ____________________________

**D. Storm Drainage:**

  1. Design for _________year occurrence.
  
  2. Type System: ___________Surface, ___________Underground

  3. Location of tie-in point for existing underground storm drainage system if incorporated in contractor design: See Site Plan.

**E. Gas Service: _____Natural, _______Propane;**

- Meter required: _____Yes, _____No.

  1. For Heating: _____Yes, ____No.
  
  2. For domestic hot water: _____Yes, _____No.

  3. For laundry dryers: _____Yes, _____No.

  4. For kitchen equipment: _____Yes, _____No.

  5. Size and location of tie-in point: ____________________________

**NOTE:** Contractor (Offeror) shall be responsible to determine that all of the existing service utilities are of sufficient capacity to accommodate all of the design loads for this total facility. Should a Contractor (Offeror) determine that one or more of the existing service utilities are not adequate to accommodate the Contractor’s (Offeror’s) design loads for this total facility, then the Contractor (Offeror) shall submit with his initial and any subsequent proposal (Best & Final Offer), the requirements, design data and the price for increasing the capacity of each existing service utility system or for providing a new service utility system. Design loads for this facility shall be calculated in accordance with the criteria specified in this Request for Proposals (RFP), with the most stringent criteria governing. The responsibility for verification and field location of any and all information provided in the RFP and on any attached or enclosed drawings, or other documents shall be and is the responsibility of the Contractor (Offeror).
F. Coordination and Notification Required for Utilities Tie-in:

1. Point of contact for coordination: ________________________________
   Tel. ____________________ Email ________________________________

2. Road Closing:
   a) Can both lanes be closed to traffic: _____ Yes, _____ No.
   b) Maximum time road can be closed:
   c) Can road be closed over a holiday or weekend: _____ Yes, _____ No.

3. Minimum notification time required for utilities outages and road closing:
   a) Electric Power: ____________ working days.
   b) Water: ________________ working days.
   c) Gas: ________________ working days.
   d) Steam: ________________ working days.
   e) Central AC lines: ____________ working days.
   f) Roads: ________________ working days.

NOTE: Enclose underground primary electrical service in concrete from the new utility tie-in points to the pad mounted transformer and/or mechanical room panel boxes. Provide one spare conduit for each service sealed at both ends. The conduit may be PVC provided it conforms to NFPA 70, current edition.

NOTE: If existing sidewalk, curbs, gutters, or paving are disturbed or removed during construction, the paving or concrete must be replaced by the Contractor.

NOTE: At overseas installations, utility work must meet Host Nation codes. Notably, in Europe utilities connections shall comply with the supplier's local codes. Contractors in Europe shall meet local utilities provider's conditions.

G. Coordination and Notification Required for Railroad Track Work:

1. Point of contact for coordination: ________________________________
   Tel. ____________________ Email ________________________________

2. Road Closing:
   a) Can both lanes of traffic be closed: _____ Yes, _____ No.
   b) Maximum time road can be closed:
   c) Can road be closed over a holiday or weekend: _____ Yes, _____ No.

3. Railroad Track Closing:
   a) Can track be closed to traffic: _____ Yes, _____ No.
   b) Maximum time track can be closed: _________________________
   c) Can track be closed over holiday of weekend: _____ Yes, _____ No.

4. Minimum notification time required for railroad track and road closing:
   a) Railroad track: working days.
   b) Road: working days.

5. Are used track components to be sorted and properly stored: ___ Yes, ___ No.

6. Are samples, ultra-sonic inspections, temperature recordings, and certificates to be submitted for ties, rail track components, or ballast: _____ Yes, _____ No.

7. Are RAILER markings and reporting required: ____ Yes, ____ No.

8. Are there special radio or communication requirements: ____ Yes, ____ No.

   NOTE: If existing sidewalk, curbs, gutters, drainage, ballast, or paving are disturbed or removed during construction, the paving, drainage, ballast, or concrete must be replaced by the Contractor.

1.5 ARCHITECTURAL AND STRUCTURAL BUILDING DESIGN REQUIREMENTS

   A. Seismic Design Zone: _________________. Structural design shall be in accordance with codes specified in the RFP.

   B. Basic wind speed: _________________ mph.

   C. Ground Snow Load: _________________ PSF (Plus code live load).

   D. Maximum Frost Penetration: _____________ inches.

   E. Heat Transmission: “U” Factors:
      1. Walls: ________________.
2. Floor (slab-on-grade) at perimeter foundation wall: ________________.

3. Floor over ventilated crawl spaces: ________________.

4. Ceiling and/or roofs: ________________.

F. Roof:

1. Minimum pitch: ________________________________________________

2. Type: _________________________________________________________

3. Scuppers and drains are required: _____ Yes, (If a parapet type roof is proposed); _____ No.

4. Gutters and downspouts: _____ Yes, _____ No, Type: ________________

5. Drainage carry off: __________ Splash Blocks; or __________ Underground drainage system (internal roof drains not permitted.)

6. Access to roof: ________________________________________________

NOTES: Catwalks to and around rooftop HVAC units and other equipment are required (Cary tread or equal). Where possible, architectural screening of visible rooftop equipment is required.

G. Site Conditions:

1. Environmental Assessment required: _____ Yes, _____ No.

   Completion Date: ________________________________________________

   EIS Required: _____ Yes, _____ No.

   Completion Date: ________________________________________________

   (Provide copies of actions to date.)

2. Cultural Resources Compliance Completed: _____ Yes, _____ No.

3. Site Conditions:

   Topographical feature description: ________________________________

   ______________________________________________________________

   ______________________________________________________________

   ______________________________________________________________
Confirm or identify subterranean hazards:

- Fill area
- Old foundations
- Unexploded ordnance
- Existing/abandoned utility line
- Tunnels/mines
- Other

4. Soil investigation data available: ___ Yes, ___ No.
   At project location: _____ Yes, _____ No.
   Other:

5. Soil bearing capacity: ___________ PFS. Actual test ___________,
   Assumed______________

**NOTE:** The successful Offeror shall be responsible for accomplishing additional necessary testing to verify soil characteristics at the site and design of the foundation system to meet these requirements.

**H. Building Exterior:** Brick: _____ Yes, _____ No.
   Other: __________________________________________

**NOTE:** Where brick is required, the exterior walls shall be finished with face brick with through body integral color and shall match the brick currently in place in Building No’s ________________

**NOTE:** The final floor plan as designed by Offerors shall include all functional areas outlined subsequently in this section. Gross building areas shall not exceed that specified in the RFP, including the mechanical room.

**I. Barrier Free Requirements:** (Where applicable) as minimum, ________ guest units shall be barrier free.

**NOTE:** Where required, “Barrier Free Requirements” shall be designed and constructed to provide for the Physically Handicapped (interior and exterior), in accordance with Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

**J. Kickplates required on interior wood doors:** _____ Yes, _____ No.

**K. Approximate total maximum occupancy:**

1. Female: Adults ___________ Children ___________
2. Male: Adults ___________ Children ________

3. TOTAL: ______________
   Comments: ________________________________________________
   ________________________________________________
   ________________________________________________

L. Landscape Requirements:
   List any special requirements:

   NOTE: Offerors will provide a Landscaping Plan for the project area as required in
   the RFP. Surface area disturbance and tree removal will be minimized. Trees determined
   to be retained will be incorporated in the Landscaping Plan. Landscaping shall refer to
   the planting of trees, shrubs, plants, etc. and shall not be associated with establishment of
   turf as defined below. Trees, shrubs, plants, etc. shall be guaranteed for a period of one
   (1) year from time of planting.

M. Establishment of Turf:

N. Soil Poisoning: For termite protection is __________, is not __________ required.

   NOTE: It will be the Contractor’s responsibility to protect all existing turf and
   landscaping affected by the construction and to replace any turf or landscaping that has
   been damaged, for the term of the contract.

O. Paint Color:
   List standard paint colors:

P. Finishes:
   List standard finishes:
1.6 ELECTRICAL DESIGN REQUIREMENTS

A. Exterior lighting:

1. Parking area (s) lighting required: _____ Yes, _____ No.
   a) Type of lighting: ___________ High Pressure Sodium
      ___________ Low Pressure Sodium
      ___________ Mercury
      ___________ Halogen
      ___________ Other
   b) Average Intensity: ___________ foot candles per sq. yd. with a uniformity ratio of 4:1
      ___________, Other ___________. (Avg. to min.)
   c) Type pole: ____________________________.
   d) Special mounting requirements:
   e) Switching:
      Type: ___________ Manual
      ___________ Clock, 7 day, 7 day
      ___________ Astronomical
      ___________ Photo Electric
      ___________ Combination of above as indicated.
      ___________ Other

2. Exterior building lighting required: ___ Yes, __ No.
   a) Type of lighting: ___________ High Pressure Sodium
      ___________ Low Pressure Sodium
      ___________ Mercury
      ___________ Halogen
      ___________ Other
b) Average Intensity: __________ foot candles per sq. yd.

c) To be mounted on the building structure: _____ Yes, _____ No.

d) Switching:

1) Type: ________________ Manual

______________ Clock , 7 day , 7 day

______________ Astronomical

______________ Photo Electric

______________ Combination of above as indicated.

______________ Other

2) Location: ________________________________.

3) Lighting for plumbing and electrical chases required:

_____ Yes, _____ No.

NOTE: All electrical wiring (exterior and interior) shall be copper.

B. Outside weather proof receptacles: shall be installed every ______ feet along the building exterior. Outside weather proof receptacles should be RCD (GFCI) protected.

NOTE: The building shall have emergency light fixtures and exit lights in accordance with NFPA requirements. Both shall have battery powered back-up, charge level meters and test buttons.

C. Electromagnetic Shielding:

List any electromagnetic shielding requirements.

D. Standby/Backup Power Requirements:

List and standby/backup power requirements.

1.7 MECHANICAL/PLUMBING DESIGN REQUIREMENTS

A. Heating design data:

1. Below is the outside dry bulb temperature that is equaled or exceeded 97 ½ percent of the time, on the average, during the coldest 3 consecutive months
(Dec., Jan., and Feb.). Heating design shall be based on the dry bulb temperature equaled or exceeded 97½ percent of the time.

   a) Dry bulb temperature: ____________.
   b) Wind velocity: ________________.
   c) Degree days: ________________.

2. Interior design temperatures: 68 degrees.

B. Air conditioning design data:

1. Outside dry bulb and wet bulb temperatures that are equaled or exceeded 2½ percent of the time, on the average, during the warmest 4 consecutive months (Jun. thru Sep.) are given below. Air conditioning design shall be based on the 2½ percent dry bulb, wet bulb temperature.

   a) Dry bulb temperature: ________________.
   b) Wet bulb temperature: ________________.

2. Interior design temperatures: ________________.

   a) Dry bulb temperature: ________________.
   b) Wet bulb temperature: ________________.

C. Heating and air conditioning system: shall be designed to provide a relative humidity of 50% + 10% or -10%.

D. Mechanical Systems: Economy cycle. The air conditioning system except where room fan coil units are located, if located where the winter design dry bulb temperature is 35 degrees F (97½% basis) or less, shall be designed so that 100% outside air may be used in the system during those cool weather periods when the outside air temperature is sufficiently low to provide all the cooling needed, or reduce the load on the air conditioning refrigeration equipment. Use of the economy cycle in areas above 358 F shall be provided when it can be clearly shown that use of the economy cycle is cost effective.

E. Install humidity control override: _____Yes, _____No.

F. Automatic timer controls required for:

G. Heating and Air Conditioning Source:
   1. Self contained plant: _____Heat, _____AC.
   2. Supply lines from central plant: _____Heat, _____AC.
   3. Purchased heat: _______________________

H. Low profile roof mounted HVAC units are permissible: _____Yes, _____No.

I. Automatic timer controls required for:

J. Heating fuel to be used:
   Fuel: _______Natural gas, _______#2 Fuel oil, _______Propane.

K. Dual fuel heating plant required: _____Yes, _____No.
   Primary Fuel _________________, Secondary Fuel ________________.

L. Outside air supply intake: to close when building is unoccupied:
   _____Yes, _____No.

M. Outside air supply intake: to close when building is unoccupied:
   _____Yes, _____No.

N. Type heating and air conditioning filters required:
   ( ) Permanent   ( ) Throw away

O. Covers and locks: required on interior utilities controls: _____Yes, _____No.

P. Plumbing Design Data:
   1. Exterior hose bibs: Minimum of _____ each with ¾” hose connection on building exterior.
      a) Frost protection required: _____Yes, _____No.
      b) Removable cutoff handles required: _____Yes, _____No.
   2. Interior hose bibs: See Functional Requirements
3. Grease trap(s) required: _____Yes, _____No.
   Location(s):

4. Commodes shall be floor mounted flush valve type.

5. Lift station required: _____Yes, _____No.

6. Hot water heater(s) required: _____Yes, _____No.
   a) Energy source: ____________ Natural gas, ____________ #2 Fuel oil.
   b) Required minimum temperature: ________________________________
   c) System: _________________________________________________

NOTE: All domestic water piping below grade shall be type K copper. All
domestic water piping above grade shall be either type L copper in accordance
with appropriate codes. All joints shall be soldered with 95/5 Tin/Antimony
solder. The entire potable water system shall be lead free. Vent piping shall be
schedule 40 galvanized steel or DWV weight copper.

7. Provide a minimum of ________ floor drain(s) in the laundry and mechanical
   room.

8. Insulate all water pipes (hot & cold) above slab: _____Yes, _____No.

NOTE: The domestic hot and cold water piping below grade shall be kept to a
minimum, and below the frost line if located outside the building perimeter.

9. All domestic water pipes (hot & cold) shall be stenciled HW or CW. If pipes
   have been insulated then the pipe insulation shall also be stenciled.

    Location: ___________________________________________________

11. Provide a water filtration system: ________Yes, _______No.
    Location: ___________________________________________________
    Type: _______________________________________________________

12. Other plumbing considerations or requirements:
2.0 MINIMUM REQUIREMENTS FOR RESTROOMS

The following criteria are for minimal requirements only and may be superseded in quantities and/or finishes, providing that changes are an upgrading of the minimal requirements.

A. General: MALE and FEMALE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>SPECIAL REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lavatory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commode</td>
<td></td>
<td></td>
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<tr>
<td>Faucets</td>
<td></td>
<td>chrome finish.</td>
</tr>
<tr>
<td>Expose pipes/valves</td>
<td></td>
<td>chrome finish.</td>
</tr>
<tr>
<td>Pipe penetrations</td>
<td></td>
<td>chrome finish escutcheons.</td>
</tr>
<tr>
<td>Clean outs</td>
<td></td>
<td>chrome covers.</td>
</tr>
<tr>
<td>Mirrors</td>
<td></td>
<td>mech. wall fasteners.</td>
</tr>
<tr>
<td>Floor drain</td>
<td></td>
<td>each restroom.</td>
</tr>
<tr>
<td>Hose bib</td>
<td></td>
<td>under lavatory in each restroom.</td>
</tr>
<tr>
<td>Wall finish</td>
<td></td>
<td>ceramic tile to 5’ height</td>
</tr>
<tr>
<td>Ceiling</td>
<td></td>
<td>moisture resistant DW.</td>
</tr>
<tr>
<td>Floors</td>
<td></td>
<td>ceramic tile w/ceramic tile base, or quarry tile w/quarry tile base.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tile shall be MUD-SET.</td>
</tr>
<tr>
<td>Toilet Partitions</td>
<td></td>
<td>at all commodes and urinals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>overhead braced w/door bumpers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>baked enamel w/skirts.</td>
</tr>
<tr>
<td>Skirts</td>
<td></td>
<td>18” stainless steel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>watertight top edge.</td>
</tr>
<tr>
<td>Duplex receptacle</td>
<td></td>
<td>GFCI type over vanity.</td>
</tr>
<tr>
<td>Paper towel dispenser</td>
<td></td>
<td>recessed in wall.</td>
</tr>
<tr>
<td>with trash receptacle</td>
<td></td>
<td>over each lavatory.</td>
</tr>
<tr>
<td>Hand dryer</td>
<td></td>
<td>liquid pump.</td>
</tr>
<tr>
<td>Soap dispenser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet paper dispenser</td>
<td></td>
<td>each commode stall.</td>
</tr>
<tr>
<td>Ash receptacle</td>
<td></td>
<td>recessed, each restroom.</td>
</tr>
</tbody>
</table>

B. Specific: WOMENS

<table>
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<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>SPECIAL REQUIREMENTS</th>
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</thead>
<tbody>
<tr>
<td>Sanitary napkin disposal</td>
<td></td>
<td>each commode stall.</td>
</tr>
<tr>
<td>Sanitary napkin disposal</td>
<td></td>
<td>each restroom, coin operated.</td>
</tr>
</tbody>
</table>

C. Specific: MENS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>SPECIAL REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinal</td>
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<td>porcelain wall mounted</td>
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<tr>
<td></td>
<td></td>
<td>w/stainless steel part.</td>
</tr>
</tbody>
</table>

3.0 FIRE PROTECTION REQUIREMENTS

A. Sprinkler system required: _____ Yes, _____ No.
   1. Type system to be installed: _______ Wet, _______ Dry.
   2. Complete coverage throughout the structure: _______Yes, _______No.
      If no, describe proposed system, layout, etc.:
   3. Exterior siamese connections are required.

B. Detection System:
   1. Smoke detectors required: _____ Yes, _____ No.
      NOTE: Radium type shall not be used.
   2. Heat detectors required: _____ Yes, _____ No.
      (Rate of Rise Heat Detectors shall not be permitted.)
      NOTE: When smoke and heat detectors are specific, full coverage of the
      building is required. In addition, heat detectors are also to be installed in
      conjunction with potential fire producing equipment such as furnaces, electric
      motors, etc. All detection devices shall be spaced and installed in accordance with
      manufacturer’s specifications and the latest edition of the NFPA in effect at the
      time of installation. Heat detectors shall be set to trigger at 1358 F. The heat and
      smoke detectors shall be the combination type. The smoke detection unit shall
      alarm locally and the heat detection unit shall alarm the facility and transmit the
      alarm to the fire department via a dedicated telephone line or appropriate
      transmission media, i.e. radio transmission equipment. Automatic cutoff of air
      handling equipment is required when smoke or heat detectors, sprinkler systems,
      or any other automatic/manual fire alarm suppression system are activated.

C. Manually Activated Fire Alarm System: installed in accordance with the latest
   edition of the NFPA in effect at the time of installation, is required. Also provide
   manual pull stations at the ends of the building. The pull stations shall be tied into a
   central panel box that will signal the fire department via a dedicated telephone line or
   appropriate transmission media, i.e. radio transmission equipment.

D. Special fire suppression system (s) required: ____ Yes, _____ No.
   Describe type, location, and justification:
E. Fire extinguishers (manually operated) are required.


2. Quantity and locations shall be based upon building design, NFPA, requirements, and coordinated with Installation’s fire department.

3. Recessed cabinet mounted: _____Yes, _____No.

NOTE: The Contractor (Offeror) shall furnish and install the recessed fire extinguisher cabinets. The cabinets shall be at a minimum 24 1½” tall, 7” deep and 8 ½” wide w/glass doors.

F. All interior finish materials shall be per NFPA standards and UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 17 April 2003.

G. Water supply lines: for the sprinkler system shall be black steel pipe.

H. The installation's standard fire alarm panels shall be specified for ease of maintenance and sustainability.

I. Emergency Lighting Requirements:

4.0 SECURITY REQUIREMENTS

A. Building physical security:

1. Intrusion detection system required: _____Yes, _____No.
   
   a) Type system to be installed.
   
   b) Desired location of detectors:
   
   c) Exterior door alarm requirements:
   
   d) Exterior window alarm requirements:

2. Duress alarm system (s) required: _____Yes, _____No.

   1. Type system to be installed.

   2. Location (s):
B. Safe (s) required: ______ Yes, ______ No.

1. Type and Number:
2. Size:
3. Location (s):
4. Secure to building: ______ Yes, ______ No, if yes, how:
5. Connect to main intrusion alarm system: ______ Yes, ______ No.

C. Remote transmission of the intrusion alarm system: to the installations master system required: ______ Yes, ______ No. If yes, provide and install the transmitter, all conduit, wiring, hookups from the intrusion alarm devices to the transmitter, as well as all exterior underground conduit, required wiring, panel boxes and all other ancillary equipment to bring the system to the existing communication transmission lines. The final connection at the communication line will be made by the government. All systems proposed shall be compatible with the existing system (s) installed at the installation. Point of coordination is Provost Marshall’s Physical Security Officer. Specify the installation's standard intrusion alarm system if required.

D. Keying requirements:

1. Rooms requiring card readers:
2. Rooms requiring cipher locks:
3. Rooms requiring individual keys:
4. Rooms requiring master keys:
5. Exterior keying requirements:
6. At least six (6) keys shall be provided for each lock. An additional twelve (12) sub master and six (6) master keys shall be provided.
7. The Offeror shall provide fifty (50) key blanks in addition to the above keying requirements.

E. All exterior doors shall have unremovable hinge pins.

F. Panic hardware shall be in accordance with NFPA requirements.

G. Hardened secure area (s) required: ______ Yes, ______ No

Location (s):

H. Fencing Requirements:
1. Location:

2. Type and height:

3. Gate requirements:

I. Antiterrorism Requirements:

1. Blast resistant windows:

2. Setbacks:

3. Barriers:

4. Others:

J. Risk/Threat Analysis Requirements:

1. Installation: Fill in unclassified pieces of risk/threat analysis.

2.

3.

5.0 COMMUNICATIONS REQUIREMENTS

A. Intercom system required: ______ Yes, ______ No.
   Give a brief description of the requirements for the system:

B. Music/Paging system required: ______ Yes, ______ No.
   Give a brief description of the requirements for the system:

C. Telephone system required: ______ Yes, ______ No.
   Location:

   Type:
Pay telephone required: ______ Yes, ______ No. If required, unit (s) will be wall hung. Contractor shall run wire and conduit from pay phone outlets to the main panel. Phones to be provided by Contractor.

NOTE: Contractor shall provide all conduit, wire, junction boxes and pull wires for the telephone system as required. Hookup of the telephone system will be performed by the Contractor. The Contractor shall coordinate all the telephone requirements with the installation's Directorate of Public Works (DPW) office and the local telephone company to determine requirements and provide space for communication equipment, panels, etc., in the mechanical room of where otherwise designed.

The basic telephone system shall be the “Centrax System” as provided by: __________

________________________________________

They system functions shall include the following:

1. Direct in dialing, with restrictions on receiving collect calls.

2. Direct out dialing to local exchange number only.

3. Restrictions on placing chargeable calls outside the local exchange, except for calls charged to credit card or calls made with the charges reversed.

D. Television system required: ________ Yes, ______ No.

1. The technical and installation requirements of the television system shall be coordinated with __________________________ the local cable television provider.

2. Locations/number of internal outlets:

3. Wiring and grounding shall be in accordance with the National Electric Code.

E. Mass Notification System (Required per UFC 4-010-01, Standard 23: for New Inhabited Buildings and for Existing Buildings (Primary Gathering and Billeting), also for Existing Buildings, Recommended for all Inhabited Buildings)

Type of Mass Notification System Required:
6.0 SIGNAGE REQUIREMENTS

(Excluding those required by NFPA and OSHA)

D. Interior signage:

E. Exterior Signage:

All exterior signage shall conform with the Army Installation Design Guide and Post Wide Paint/Exterior Finish Standards and color charts.

7.0 OTHER COMMENTS
Installations - Expand or modify entries as necessary for particulars within your geographical area or specific objectives of the Region, Command, or installation to meet Army standards.

C.1 The following checklist is optional and is designed for use on major projects.
# INTERIOR DESIGN REVIEW CHECKLIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
</tr>
</thead>
</table>

## 1. Installation

<table>
<thead>
<tr>
<th>Job Description</th>
<th>Project</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building No.</td>
<td>Building Cost$</td>
<td></td>
</tr>
<tr>
<td>Evaluator</td>
<td>Furnishing Cost$</td>
<td></td>
</tr>
<tr>
<td>Using Agency Coordinator</td>
<td>Phone#</td>
<td></td>
</tr>
<tr>
<td>Designer</td>
<td>Phone#</td>
<td></td>
</tr>
</tbody>
</table>

## 2. Is the interior design integral to the facility design?

- Interior design is specified by the using agency.
- Scope of work includes building related interior design.
- Scope of work includes furniture related interior design.
- Design incorporates Army Installation Design Guide and Standards criteria.
- DPW representative was a member of Pre-selection and/or Selection Boards.

<table>
<thead>
<tr>
<th>Preselection member:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection member:</td>
</tr>
</tbody>
</table>

## 3. Was the designer provided interior design criteria?

- Designed Guide for Interiors DG 1110-3-122.
- Design Guide for facility type designed.
- Army Installation Design Guide and Standards.

## 4. The design has been reviewed and the following are acceptable?

**For building related interior design?**

- Statement of Design Objective
- Sketches
- Color Board
- Furniture Plan
<table>
<thead>
<tr>
<th>ITEM</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Exterior Materials and Finishes</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Graphic Design</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hand Drawn Sketches</td>
<td></td>
<td></td>
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<tr>
<td>Digital image files (JPG, BMP, etc.)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3D Model</td>
<td></td>
<td></td>
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<tr>
<td>Animation (AVI, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Interior Design Finish Schedule</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Government Furnished Material List</td>
<td></td>
<td></td>
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<tr>
<td><strong>Items for Installation of Furniture and Accessories</strong></td>
<td></td>
<td></td>
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<tr>
<td>- Predesign Evaluation:</td>
<td></td>
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<tr>
<td>Maintenance Data</td>
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<tr>
<td>Floor Systems</td>
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<tr>
<td>Electrical Equipment and Task/Supplemental Lighting</td>
<td></td>
<td></td>
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<tr>
<td>- Interior Element Specification</td>
<td></td>
<td></td>
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<tr>
<td>Cost Estimates:</td>
<td></td>
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<tr>
<td>Maintenance and Repair</td>
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<tr>
<td>New Work</td>
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<tr>
<td>Equipment-in-place and Furnishings</td>
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<tr>
<td><strong>For furniture related interior design:</strong></td>
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<tr>
<td>- Typical furniture layout</td>
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<tr>
<td>- Furnishing, fabrics and finishes board</td>
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<tr>
<td>- Furnishings plan</td>
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<tr>
<td>- Sketch perspectives</td>
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<tr>
<td>- Colored rendering</td>
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<tr>
<td>- Photographs</td>
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<tr>
<td>- Catalog Cuts</td>
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<tr>
<td>- Furnishing illustration sheets</td>
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<td>- Furnishing placement lists</td>
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<td>- Furnishing order forms</td>
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<td>- Furnishing contract specifications</td>
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<tr>
<td>ITEM</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<tr>
<td>5. Does the interior design address the following functions?</td>
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<tr>
<td>- Communications</td>
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<tr>
<td>- Storage/filing</td>
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<tr>
<td>- Display surfaces</td>
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<td>- Work surfaces</td>
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<tr>
<td>- Conference Space(s)</td>
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<tr>
<td>- Privacy</td>
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<tr>
<td>- Lighting</td>
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<td></td>
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<tr>
<td>- Planting</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Spatial considerations</td>
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<td></td>
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<tr>
<td>- Color/texture characteristics</td>
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<tr>
<td>- Reflectance values</td>
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<tr>
<td>- Acoustical considerations</td>
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<tr>
<td>- Mechanical fixture placement</td>
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<tr>
<td>- Electronic support</td>
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<tr>
<td>- Furnishings/accessories</td>
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<tr>
<td>- Work, training or paper flow</td>
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<tr>
<td>- Hardware selection</td>
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<tr>
<td>- Graphics/signage</td>
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<tr>
<td>- Force Protection</td>
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<tr>
<td>- Physical Security</td>
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<tr>
<td>- Fire Safety</td>
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<tr>
<td>6. Construction and installation phase</td>
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<tr>
<td>- Positive first impression is created</td>
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<tr>
<td>- Coordinated color scheme, interior reflecting exterior</td>
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<tr>
<td>- Area &amp; shape of spaces match function &amp; support mission</td>
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<tr>
<td>- Furnishings support function of space</td>
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<tr>
<td>- Creative use of interior design spaces</td>
<td></td>
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<tr>
<td>ITEM</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<tr>
<td>----------------------------------------------------------------------</td>
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<tr>
<td>- Retained designer to review and approve contractor submittals</td>
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<tr>
<td>- Retained designer to oversee the installation of furnishings</td>
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<tr>
<td>- Color boards were required and reviewed</td>
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<tr>
<td>- Interior appearance policy is implemented</td>
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</tbody>
</table>

Describe actions taken to ensure quality interior design to all negative responses on an attached sheet. Maintain a copy of this interior design review checklist and all negative responses in the DPW project file.

I hereby certify that the information provided is in compliance with the guidelines of the installation or applicable IDG, except as justified as non-compliance.

Designer of Record

<table>
<thead>
<tr>
<th>Concur</th>
</tr>
</thead>
</table>

Deny (Explanation of denial is attached.)

Master Planner

<table>
<thead>
<tr>
<th>Accept</th>
</tr>
</thead>
</table>

Deny (Explanation of denial is attached.)

Command Review (Where Applicable)

<table>
<thead>
<tr>
<th>Date</th>
</tr>
</thead>
</table>

03 May 2004  Page C-6
D.1 WHAT IS SUSTAINABLE DESIGN?

D.1.1 Sustainable design and development is an integrated approach to planning, designing, building, operating, and maintaining facilities in a collaborative and holistic manner among all stakeholders (Fig. D.1). It is a systematic process and engineering practice with how to do it guidance, checklist, tools, and scoring systems. Sustainable design integrates the decision-making across the installation, basing every decision on the greatest long-term benefits and recognizing the interrelationship of installation actions with the natural environment. In the context of Army installations Sustainable Design is the design, construction, operation, and reuse/removal of the built environment in an environmentally and energy efficient manner (Fig. D.2). The basic objectives of sustainability are:

D.1.1.1 Reduce the consumption of energy, land, materials, water, and other non-renewable resources.

D.1.1.2 Minimize the waste of energy, land, materials, water, and other limited resources.

D.1.1.3 Protect the natural environment that is the source of all resources.

D.1.1.4 Create livable, healthy, and fiscally productive manmade environments for existing and future generations.

D.1.2 Designing for sustainability ultimately increases quality of life through better resource protection and use. The design process
must incorporate a change in mind-set that embraces less consumptive lifestyles. This mind-set change must include global interdependence, stewardship of the environment, social responsibility, and economic viability. The new design mind-set must change from the traditional approach to recognize the impacts of every design choice on natural and cultural resources and on local, regional, and global environments.

D.2 SUSTAINABLE DESIGN AND DEVELOPMENT

D.2.1 Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice. Protecting our natural resources and reducing our impact on the natural environment is achievable when we create energy efficient (Fig. D.3), healthy (Fig. D.4), high-performance (Fig. D.5), and safe buildings.

D.2.2 The Integrated Design Process. Critical to the success of sustainable design and development is the organization and commitment of the team to engage in the Integrated Design Process. To effect change in building design and operation, the project delivery process itself must become a collaborative effort to integrate design strategies among all disciplines and all players in the project delivery process. Integrated design demands a more inclusive team, working closer together than is traditionally the case. Future building users and facility managers must be invited to join architects, engineers, and planners in developing the vision and goals for new facilities. (Adapted from the HOK Guidebook to Sustainable Design)

D.2.3 Appendix D, Sustainable Design, discusses the sustainable design concept and its application to Army projects. Paragraph D.3 discusses the Sustainable Project Rating Tool (SPIRiT) developed by the U.S. Army Corps of Engineers (USACE). Per the Assistant Secretary of the Army (Installation & Environment) Sustainable Design and Development Memorandum and the Assistant Chief of Staff for Installation Management (ACSIM) endorsement of Sustainable Design and Development initiative, the SPIRiT rating system will be used by design professionals in all new construction, additions, or renovation of Army facilities for rating sustainability.

D.2.3.1 The SPIRiT document (Appendix E) was derived from the U.S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System. See Website “SPIRiT Wizard” which outlines using SPIRiT, records
and tracks rationale, generates SPiRiT rating and permits reuse of previous strategies for subsequent projects.

D.2.3.2 Army Rating Standard

D.2.3.2.1 The SPiRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18, 2003). For all other FY06 and future-year MILCON projects, the minimum SPiRiT rating requirement is "Gold". See Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.

D.2.4 Further information on sustainable design can be obtained at the following websites:

D.2.4.1 Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website This site provides information on the following topics: documentation and references; sustainable process, tools, products and materials; Sustainable Design and Development Training; and links to various sustainable design and development informational website.

D.2.4.2 U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website.

D.2.4.3 Whole Building Design Guide (WBDG) This site provides comprehensive and current information on sustainable design strategies and technologies.

D.3 SUSTAINABILITY AND THE FEDERAL GOVERNMENT

D.3.1 The Federal Government has led the nation in the energy efficient, resource-conserving building design, construction, and operation. Executive Order (EO) 13123, “Greening the Government through Efficient Energy Management”, was issued June 3, 1999. This Order establishes that sustainable design principles shall be applied to all Federal projects in order to reduce pollution and other environmental costs associated with facility construction, operation, and eventual decommissioning. The principles of sustainable design for Federal Agencies established by EO 13123 include siting, design, and construction, as follows (Fig. D.6):
D.3.1.1 Site - Optimize site potential.

D.3.1.2 Energy – Minimize nonrenewable energy consumption.

D.3.1.3 Materials – Use environmentally preferable products.

D.3.1.4 Water – Protect and conserve water.

D.3.1.5 Indoor Environmental Quality – Enhance indoor environmental quality.

D.3.1.6 Facility Delivery – Holistic delivery of facility.

D.3.1.7 O&M – Optimize operational and maintenance practices.

D.3.1.8 Future Missions – Functional life of facility and support systems.

D.4 SPiRiT

D.4.1 The U.S. Army Corps of Engineers (USACE) has developed a checklist for sustainability to be used by design professionals in all new construction, additions, or renovation of Army facilities. This checklist is the “Sustainable Project Rating Tool (SPiRiT)”. The SPiRiT document was derived from the U.S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System.

D.4.2 SPiRiT is a rating tool that offers a checklist, strategies, and scores to provide sustainable facilities to the Army. SPiRiT allows environmentally responsible practices to be integrated into the process of facility delivery form the very beginning of the project. By using a "whole building" perspective, the SPiRiT rating tool (See Appendix E, SPiRiT Checklist) helps in preserving the environment and improving facility life-cycle management. SPiRiT is based on accepted energy and environmental principles.

D.4.3 The SPiRiT document includes eight (8) categories of design concerns (Fig. D.7). A facility points summary is included at the end of the document. Points are achieved based upon the sustainable design issues addressed in the building, site and infrastructure design. The design is certified by the designer and design review personnel based upon the following certification levels.

D.4.3.1 SPiRiT Bronze 25 to 34 Points

D.4.3.2 SPiRiT Silver 35 to 49 Points
D.4.3.3 SPiRiT Gold 50 to 74 Points

D.4.3.4 SPiRiT Platinum 75 to 100 Points

D.5 ARMY STANDARDS

D.5.1 The cited Army Standards shall be met.

- The SPiRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18 2003). For all other FY06 and future-year MILCON projects, the minimum SPiRiT rating requirement is "Gold". See Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.

D.6 REFERENCES

D.6.1 The following references are provided for guidance.

- Assistant Chief of Staff for Installation Management memorandum Subject: Sustainable Project Rating Tool, dated 21 December 2002
- Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website
- U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website
- Air Force Sustainable Facilities Guide
- Whole Building Design Guide
APPENDIX E
SPiRiT
CHECKLIST
### Facility Points Summary

<table>
<thead>
<tr>
<th>1.0</th>
<th>Sustainable Sites (S)</th>
<th>Score</th>
<th>Max 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.R1 *</td>
<td>Erosion/Sedimentation/Water Quality Control</td>
<td>[Required]</td>
<td></td>
</tr>
<tr>
<td>1.C1 *</td>
<td>Site Selection</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.C2 *</td>
<td>Installation/Base Redevelopment</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.C3 *</td>
<td>Brownfield Redevelopment</td>
<td>1</td>
<td></td>
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<tr>
<td>1.C4 *</td>
<td>Alternative Transportation</td>
<td>4</td>
<td></td>
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<tr>
<td>1.C5 *</td>
<td>Reduced Site Disturbance</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.C6 *</td>
<td>Storm water Management</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.C7</td>
<td>Landscape &amp; Ext. Design to Reduce Heat Islands</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.C8 *</td>
<td>Light Pollution Reduction</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1.C9 **</td>
<td>Optimize Site Features</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1.C10 **</td>
<td>Facility Impact</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.C11 **</td>
<td>Site Ecology</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>2.0</th>
<th>Water Efficiency (W)</th>
<th>Score</th>
<th>Max 5</th>
</tr>
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<tbody>
<tr>
<td>2.C1</td>
<td>Water Efficient Landscaping</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2.C2</td>
<td>Innovative Wastewater Technologies</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2.C3 *</td>
<td>Water Use Reduction</td>
<td>2</td>
<td></td>
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<table>
<thead>
<tr>
<th>3.0</th>
<th>Energy and Atmosphere (E)</th>
<th>Score</th>
<th>Max 28</th>
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</thead>
<tbody>
<tr>
<td>3.R1 *</td>
<td>Fundamental Building Systems Commissioning</td>
<td>[Required]</td>
<td></td>
</tr>
<tr>
<td>3.R2 *</td>
<td>Minimum Energy Performance</td>
<td>[Required]</td>
<td></td>
</tr>
<tr>
<td>3.R3</td>
<td>CFC Reduction in HVAC&amp;R Equipment</td>
<td>[Required]</td>
<td></td>
</tr>
<tr>
<td>3.C1 *</td>
<td>Optimize Energy Performance</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>3.C2 *</td>
<td>Renewable Energy</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3.C3</td>
<td>Additional Commissioning</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3.C5 *</td>
<td>Measurement and Verification</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3.C6 *</td>
<td>Green Power</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3.C7 **</td>
<td>Distributed Generation</td>
<td>1</td>
<td></td>
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<table>
<thead>
<tr>
<th>4.0</th>
<th>Materials and Resources (M)</th>
<th>Score</th>
<th>Max 13</th>
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<tr>
<td>4.R1 *</td>
<td>Storage &amp; Collection of Recyclables</td>
<td>[Required]</td>
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</tr>
<tr>
<td>4.C1 *</td>
<td>Building Reuse</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4.C2 *</td>
<td>Construction Waste Management</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4.C3</td>
<td>Resource Reuse</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4.C4 *</td>
<td>Recycled Content</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4.C5</td>
<td>Local/Regional Materials</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4.C6</td>
<td>Rapidly Renewable Materials</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4.C7</td>
<td>Certified Wood</td>
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<table>
<thead>
<tr>
<th>5.0</th>
<th>Indoor Environmental Quality (IEQ)</th>
<th>Score</th>
<th>Max 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.R1 *</td>
<td>Minimum IAQ Performance</td>
<td>[Required]</td>
<td></td>
</tr>
<tr>
<td>5.R2</td>
<td>Environmental Tobacco Smoke (ETS) Control</td>
<td>[Required]</td>
<td></td>
</tr>
<tr>
<td>5.C1 *</td>
<td>IAQ Carbon Dioxide (CO2) Monitoring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5.C2</td>
<td>Increase Ventilation Effectiveness</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5.C3</td>
<td>Construction IAQ Management Plan</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5.C4</td>
<td>Low-Emitting Materials</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5.C5 *</td>
<td>Indoor Chemical and Pollutant Source Control</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5.C6</td>
<td>Controllability of Systems</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5.C7</td>
<td>Thermal Comfort</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5.C8</td>
<td>Daylight and Views</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5.C9 **</td>
<td>Acoustic Environment/Noise Control</td>
<td>1</td>
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</table>
### SUSTAINABILITY PROJECT RATING TOOL (SPiRiT)

<table>
<thead>
<tr>
<th>5.C10 **</th>
<th>Facility In-Use IAQ Management Plan</th>
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<tr>
<td>6.0</td>
<td>Facility Delivery Process (P)</td>
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<tr>
<td>6.C1 **</td>
<td>Holistic Delivery of Facility</td>
<td>7</td>
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<tr>
<td>7.0</td>
<td>Current Mission</td>
<td>Score</td>
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<tr>
<td>7.C1 **</td>
<td>Operation and Maintenance</td>
<td>3</td>
</tr>
<tr>
<td>7.C2 **</td>
<td>Soldier and Workforce Productivity and Retention</td>
<td>3</td>
</tr>
<tr>
<td>8.0</td>
<td>Future Missions</td>
<td>Score</td>
</tr>
<tr>
<td>8.C1 **</td>
<td>Functional Life of Facility and Supporting Systems</td>
<td>2</td>
</tr>
<tr>
<td>8.C2 **</td>
<td>Adaptation, Renewal and Future Uses</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total Score</td>
<td>0</td>
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#### SPiRiT Sustainable Project Certification Levels

<table>
<thead>
<tr>
<th>Certification Level</th>
<th>Points Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army Standard - SPiRiT Bronze</td>
<td>25 to 34 Points</td>
</tr>
<tr>
<td>Army Goal - SPiRiT Silver</td>
<td>35 to 49 Points</td>
</tr>
<tr>
<td>SPiRiT Gold</td>
<td>50 to 74 Points</td>
</tr>
<tr>
<td>SPiRiT Platinum</td>
<td>75 to 100 Points</td>
</tr>
</tbody>
</table>

#### Links

- Go to Appendix F
- Go to Table of Contents
APPENDIX F
LANDSCAPE MAINTENANCE SCHEDULE
To setup the shaded block across the month columns do the following.
1. Block the area you would like to setup using your mouse.
2. Using fill color icon, choose the color to fill in the blocked area.
3. Block the area again and right click on the box. Choose format cells then choose the border tab.
4. Delete all of the borderlines and press the outline button.

Complete these blocks with activities that occur during the identified time duration.

<table>
<thead>
<tr>
<th>JANUARY</th>
<th>FEBRUARY</th>
<th>MARCH</th>
<th>APRIL</th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>AUGUST</th>
<th>SEPTEMBER</th>
<th>OCTOBER</th>
<th>NOVEMBER</th>
<th>DECEMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAWNS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREES AND SHRUBS</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</table>

NAME OF INSTALLATION

03 May 2004
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APPENDIX G
PRIORITIZED IMPROVEMENTS PROJECTS LIST

Links
Go to Appendix H
Go to Table of Contents
## Prioritized Improvements Projects List

**INSTALLATION:**
- PRESS "ENTER" TO INSERT A NEW LINE.
- PRESS "TAB" AT END OF LAST ITEM TO INSERT NEXT ITEM #.

### DPW or EQUIVALENT - MASTER PLANNER

<table>
<thead>
<tr>
<th>NAME:</th>
<th>PHONE:</th>
<th>EMAIL:</th>
<th>ADDRESS:</th>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PRIORITY NO.</th>
<th>PROJECT TITLE</th>
<th>RECOMMENDED FUNDING SOURCE</th>
<th>ALTERNATIVE FUNDING SOURCE</th>
<th>COST ESTIMATE</th>
<th>IDG PARA NO.</th>
<th>POINT OF CONTACT</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

03 May 2004
**Installation:** develop a self-help projects checklist in accord with the degree of latitude given to self-help projects at your installation.
THIS PAGE INTENTIONALLY LEFT BLANK
Installation: develop per guidance in section 8, paragraph 8.13, sub-paragraph 8.13.10 (interior design).

Paragraph 8.13.10
Installation: develop per guidance in section 8, paragraph 8.13, sub-paragraph 8.13.13 (interior design).

Paragraph 8.13.13
## EXTERIOR MATERIALS CHART
**VISUAL ZONE:** *Installation: Enter Name of Visual Zone*

<table>
<thead>
<tr>
<th>Building Design Element</th>
<th>Permitted Material Type</th>
<th>Notes (Hyperlinked)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td><strong>Base (primary) material</strong> <em>Installation: Enter material type, modify form as necessary</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Secondary material</strong></td>
<td></td>
</tr>
<tr>
<td>Sloped areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Flat” areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm Doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door &amp; Window Frames</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm window or sash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fascia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soffit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gutters and D.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Awnings and canopies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stair or balcony railings, balusters, and related trim/accessories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handrails</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Design Element</td>
<td>Permitted Material Type</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Fire Escapes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grilles and louvers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof ventilators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courtyard enclosure walls, retaining walls, fences, dumpster enclosures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porch crawl space enclosure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

| Note 1 | Installation: Enter notes where applicable. |
| Note 2 | Installation: Tab to expand note listings. |
| Note 3 | | |
APPENDIX L
EXTERIOR COLOR CHARTS

EXTERIOR COLOR REGIONS

<table>
<thead>
<tr>
<th>Page</th>
<th>Area</th>
<th>Page</th>
<th>Area</th>
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</thead>
<tbody>
<tr>
<td>L7-8</td>
<td>Southeast USA</td>
<td>L17-18</td>
<td>Northwest USA</td>
</tr>
<tr>
<td>L9-10</td>
<td>Northeast USA</td>
<td>L19-20</td>
<td>Pacific Ocean</td>
</tr>
<tr>
<td>L11-12</td>
<td>Central Atlantic USA</td>
<td>L21-22</td>
<td>Alaska</td>
</tr>
<tr>
<td>L13-14</td>
<td>Southwest USA</td>
<td>L23-24</td>
<td>Far East (Japan &amp; Korea)</td>
</tr>
<tr>
<td>L15-16</td>
<td>Plains USA</td>
<td>L25-26</td>
<td>Europe</td>
</tr>
</tbody>
</table>
L.1  EXTERIOR COLOR CHARTS for INSTALLATION BUILDINGS

Colors schemes and building materials are critical design elements in relating adjacent buildings and creating a compatible visual environment within an installation. Related Army Standards are found in Chapter 3, Paragraph 3.5.5 Color, 3.5.5.2 Historic Buildings, 3.5.6 Texture, 3.5.7 Material, and 3.11 Renovations and Additions. This section identifies the Army standard palette of colors that will unify installations. A sufficient color palette range is provided to allow for variety. General direction on the use and application of materials and their colors follows:

- Avoid cluttered, cosmetic application of a number of different colors on a facade. The exterior color scheme should consist of a wall color, trim color, and an accent color, all of which should work together with the choice of roofing to provide a harmonious appearance compatible with adjacent structures and environs.

- Select colors from the following Exterior Color Chart based upon their appropriateness to the building type, desired appearance, material to be painted, and prevailing architectural design and landscape character of the installation. Sustainability and ease of maintenance should also be considered.

- Avoid garish colors. Strong or vibrant colors should be used with restraint and should be limited to accents or focal points such as entrance doors where appropriate.

L.2  PANTONE® COLORS

The six-digit color designations found in the Exterior Color Charts are numbers taken from the PANTONE for architecture and interiors color guide, which have been cross-referenced to the PANTONE process guide coated. The colors in the PANTONE process guide coated are intended for viewing on a color monitor and for printing on a four-color process printer (CMYK) using ISO 2846-1 inks. With proper calibration, colors viewed and printed should accurately represent the specified color.

- Calibration for Dell FP E171 and 1800FP Monitor is per manufacturer’s recommendation.

- Calibration for Hewlett Packard Color 4500 is per manufacturer’s recommendation.

- For calibration of equipment other than the above, contact Pantone, Inc. at (201) 935-5500.

L.3  COLOR VALIDATION

L.3.1 Due to calibration and other technical problems, the color of paint to be used should be based on manufacturer’s correspondence to the six-digit PANTONE Number and shall not be predicated on matching a computer-generated sample as seen in the Exterior Color Charts.

L.3.2 “White” when given without a number shall be construed as generic and is intended to cover those manufacturer’s paints and finished materials called “white”. Some slight variance may be discernible from one manufacturer to another.

L.4  COLOR NAMES
Names given for colors are not those assigned by Pantone, Inc., but are the generic names used by the Army for general color identification only. Always use the six-digit PANTONE for architecture and interiors color guide number instead of the generic name when specifying a color.

L.5 SUPPLEMENTAL COLOR BOARD

L.5.1 Included in this Appendix is a Color Board (Page L-4) containing squares with a simulation of each color used in the Exterior Color Charts. The electronic reproduction of this Color Board is, however, subject to some distortion and the color will be inaccurate to a greater or lesser degree depending on the printer used, and must, therefore, not be used in an attempt to accurately match or select paint samples.

L.5.2 A hard copy is available which contains accurate representations of all of the Army’s standard exterior colors. This hard copy is the supplemental COLOR BOARD for the IDS APPENDIX L: HARD COPY VERSION (Supplemental Page L-4a, intended to be inserted immediately following Page L-4 as a supplement to that page).

L.5.3 The hard copy version of the color board may be requested by E-mail at:

Baxter.Lawrence@mantech.com with a copy to Dannie.Fason@mantech.com

If the E-mail is not acknowledged within three business days, call (703) 378-1030 to verify the request. Provide the following information: quantity of color boards requested; name, title, and telephone number of person placing the order; mailing address; and the name of the installation.

L.6 FACTORY FINISHED MATERIALS

Colors given for surfaces that will be factory finished during manufacturing are intended for guidance and are not intended to constitute a directive for a custom color or finish. Colors shall be selected from standard manufacturer colors with the exception of those products, which can be finished with a custom color at no additional cost or that would not result in diminishment of the standard material guarantee or serviceability.

L.7 SPECIALTY FINISHES

Site Elements, addressed in Chapter 6, are painted one of the colors used in the Color Charts and shown on the Color Board. Fire Hydrants (See paragraph 6.6.6.5.) which shall be Nutmeg Brown in color shall be finished in a standard manufacturer’s paint, suitable for this application, to which glass beads or other suitable reflective material has been added so as to create a light reflective finish meeting NFPA standards. Glass beads shall be Type I per GSA Federal Specifications (FS) TT-B-1325 and shall be incorporated into paint so as to maximize both adhesion and reflectivity.

L.8 WATER STORAGE TANK FINISHES

Water storage tank finishes shall be in accordance with guidance provided in Chapter 6, paragraph 6.6.6.4.
COLOR BOARD for the Army Installation Design Standards / Appendix L

The color squares shown here are approximations of the PANTONE® for architecture and interiors color numbers indicated. They have been simulated using RGB values and are intended to be reproduced electronically. Color quality may vary with printer. PANTONE colors are a standard. In order to accurately reproduce the specified colors on these sheets and meet the required US Army standard, you must use the actual PANTONE swatch of the color indicated. A hard copy supplemental sheet with accurate color representations is available. See Paragraph L.5 for details.

PANTONE
11-0604 TPX SHELL

PANTONE
11-0907 TPX ALMOND

PANTONE
12-0910 TPX CUSTARD

PANTONE
12-4607 TPX PASTEL SKY

PANTONE
13-1009 TPX TAN

PANTONE
13-1013 TPX ALLSPICE

PANTONE
13-1107 TPX BEIGE

PANTONE
14-4506 TPX BLUEGRAY

PANTONE
15-1306 TPX TAUPE

PANTONE
15-1309 TPX NATURAL

PANTONE
15-5704 TPX GRAY

PANTONE
16-1210 TPX MOCHA

PANTONE
16-1221 TPX BROWN

PANTONE
16-6216 TPX METAL GREEN

PANTONE
18-1027 TPX DARK BROWN

PANTONE
18-1444 TPX SALSA

PANTONE
19-1540 TPX MAROON

PANTONE
14-4318 TPX SKY BLUE

PANTONE
18-1222 TPX NUTMEG BROWN

PANTONE colors displayed here may not match PANTONE-identified standards. Consult current PANTONE for architecture and interiors color publications for accurate color. PANTONE® and other Pantone, Inc. trademarks are the property of Pantone, Inc. © Pantone, Inc., 2004. All rights reserved.
<table>
<thead>
<tr>
<th>Source</th>
<th>Old Federal Color Name and/or Number</th>
<th>Other Name and/or Number</th>
<th>IDS Name (Generic)</th>
<th>PANTONE Color Number</th>
<th>Process Number</th>
<th>(C-M-Y-K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Paint Number</td>
<td>Tan 23578</td>
<td>TAN</td>
<td></td>
<td>PANTONE 13-1009 TPX</td>
<td>24-7</td>
<td>0-10-25-10</td>
</tr>
<tr>
<td>Federal Paint Number</td>
<td>Tan 23717</td>
<td>CUSTARD</td>
<td></td>
<td>PANTONE 12-0910 TPX</td>
<td>22-8</td>
<td>0-5-15-0</td>
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<tr>
<td>Federal Paint Number</td>
<td>Gray 26492</td>
<td>GRAY</td>
<td></td>
<td>PANTONE 15-5704 TPX</td>
<td>329-9</td>
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<td>Federal Paint Number</td>
<td>Brown 20313</td>
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<td>Federal Paint Number</td>
<td>Ochre 31643</td>
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<td>Duron</td>
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<td>(Oyster White)</td>
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<td>PANTONE 11-0907 TPX</td>
<td>32-9</td>
<td>0-5-10-0</td>
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<td>Alcazar Brown 8306N</td>
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<td>318-1</td>
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<td>White 5770W</td>
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<td>Dusty Trail # 425</td>
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<td>ICI</td>
<td>Sand Motif # 422</td>
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<td>ICI</td>
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<td>ICI</td>
<td>Liberty Red # 159</td>
<td>MAROON</td>
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<td>PANTONE 19-1540 TPX</td>
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<td>SHERMAN WILLIAMS</td>
<td>JAVA SW6090</td>
<td>NUTMEG BROWN</td>
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<td>PANTONE 18-1222 TPX</td>
<td>322-9</td>
<td>50-55-55-0</td>
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NOTE: Please refer to Appendix L (Supplemental Page L-4a) for accurate representations of the PANTONE for architecture and interiors color numbers indicated. The suffix TPX indicates that the color is shown on paper. PANTONE® and other Pantone, Inc. trademarks are the property of Pantone, Inc., 2004. All rights reserved.
<table>
<thead>
<tr>
<th>Building Design Element</th>
<th>Required Color Standard</th>
<th>Color Sample (See Note 3)</th>
<th>Notes (Hyperlinked)</th>
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<tr>
<td>Walls</td>
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<tr>
<td>Base (primary) Material</td>
<td>Red Brick, or limestone neutral gray tones</td>
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<td>Secondary Material</td>
<td>For Tan use PANTONE® 13-1009 TPX or for Custard use PANTONE 12-0910 TPX</td>
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<tr>
<td></td>
<td>For Gray use PANTONE 15-5704 TPX or for Taupe use PANTONE 15-1306 TPX or White (not shown)</td>
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<tr>
<td>Sloped Areas</td>
<td>For Metal Green use PANTONE 16-6216 TPX or Terracotta</td>
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<td></td>
<td>Clay Terracotta</td>
<td></td>
<td></td>
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<td></td>
<td>Fiberglass Shingle Gray/White</td>
<td></td>
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<tr>
<td>“Flat” Areas</td>
<td>White</td>
<td></td>
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<tr>
<td>Roof</td>
<td></td>
<td></td>
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<tr>
<td>Doors</td>
<td>Wood: For White use PANTONE 11-0604 TPX</td>
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<td></td>
<td>Steel: For Dark Brown use PANTONE 18-1027 TPX</td>
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<tr>
<td>Storm Doors</td>
<td>White</td>
<td></td>
<td></td>
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<tr>
<td>Door &amp; Window Frames</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td></td>
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<tr>
<td>Storm Window or Sash</td>
<td>White</td>
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<tr>
<td>Window</td>
<td>White</td>
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<tr>
<td>Fascia</td>
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<td>Soffit</td>
<td>White</td>
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<tr>
<td>Gutters and D.S.</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
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<tr>
<td>Awnings and Canopies</td>
<td>For Tan use PANTONE 12-0910 TPX</td>
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<tr>
<td>Stair or Balcony Railings, Balusters, and related Trim</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
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<td>Handrails</td>
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<td>Building Design Element</td>
<td>Required Color Standard</td>
<td>Color Sample</td>
<td>Notes</td>
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<tr>
<td><strong>Trim Items</strong></td>
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<tr>
<td>Fire Escapes</td>
<td>For Dark Brown use PANTONE® 18-1027 TPX</td>
<td><img src="image1" alt="Color Sample" /></td>
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<tr>
<td>Grilles and Louvers</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td><img src="image2" alt="Color Sample" /></td>
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<tr>
<td>Coping</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td><img src="image3" alt="Color Sample" /></td>
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<tr>
<td>Roof Ventilators</td>
<td>Blend to match roof</td>
<td><img src="image4" alt="Color Sample" /></td>
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<tr>
<td><strong>Related Site Structures</strong></td>
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<td>Courtyard Enclosure Walls, Retaining Walls, Fences, Dumpster Enclosures</td>
<td>Red Brick or For Dark Brown use PANTONE 18-1027 TPX</td>
<td><img src="image5" alt="Color Sample" /></td>
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<tr>
<td>Porch Crawl Space Enclosure</td>
<td>White</td>
<td><img src="image6" alt="Color Sample" /></td>
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</tr>
</tbody>
</table>

**NOTES:**

**Note 1**  *Installation: Enter notes where applicable. Tab to expand note listings.*

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Gray cool tone colors have been omitted from this area color palate. The cool grays tend to “wash out” and appear “muddy” in the cloudy, overcast, or foggy weather conditions that are frequent.

<table>
<thead>
<tr>
<th>Building Design Element</th>
<th>Required Color Standard</th>
<th>Color Sample (See Note 3)</th>
<th>Notes (Hyperlinked)</th>
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</thead>
<tbody>
<tr>
<td>Base (primary) Material</td>
<td>Red or Brown Brick</td>
<td><img src="image" alt="Red or Brown Brick" /></td>
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<tr>
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<tr>
<td></td>
<td>For Almond use PANTONE® 11-0907 TPX, for Custard use PANTONE 12-0910 TPX, or for Mocha use PANTONE 16-1210 TPX</td>
<td><img src="image" alt="For Almond use PANTONE® 11-0907 TPX, for Custard use PANTONE 12-0910 TPX, or for Mocha use PANTONE 16-1210 TPX" /></td>
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<tr>
<td>Sloped Areas</td>
<td>For Metal Bronze or Metal Green use PANTONE 16-6216 TPX</td>
<td><img src="image" alt="For Metal Bronze or Metal Green use PANTONE 16-6216 TPX" /></td>
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<tr>
<td></td>
<td>Clay Terracotta</td>
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<td></td>
<td>Fiberglass Shingle, Dark Gray or White</td>
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<tr>
<td>“Flat” Areas</td>
<td>White or buff</td>
<td><img src="image" alt="White or buff" /></td>
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<tr>
<td>Storm Doors</td>
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<tr>
<td>Door &amp; Window Frames</td>
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<tr>
<td>Storm Window or Sash</td>
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<td>Window</td>
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<tr>
<td>Fascia</td>
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<td>Soffit</td>
<td>White</td>
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<td>Gutters and D.S.</td>
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<tr>
<td>Stair or Balcony Railings, Balusters, and related Trim</td>
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<td>Building Design Element</td>
<td>Required Color Standard</td>
<td>Color Sample (See Note 4)</td>
<td>Notes</td>
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<tr>
<td>Fire Escapes</td>
<td>For Dark Brown use PANTONE® 18-1027 TPX</td>
<td>⬇️</td>
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<tr>
<td>Grilles and Louvers</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td>⬇️</td>
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<td>Coping</td>
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<td>Roof Ventilators</td>
<td>Blend to match roof</td>
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<tr>
<td>Courtyard Enclosure Walls, Retaining Walls, Fences, &amp; Dumpster Enclosures</td>
<td>For Dark Brown use PANTONE 18-1027 TPX Or Red Brick</td>
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<tr>
<td>Porch Crawl Space Enclosure</td>
<td>White</td>
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## EXTERIOR COLOR CHART

**Central Atlantic USA**

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<td>Base (primary) Material</td>
<td>Red Brick or limestone neutral gray tones</td>
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<tr>
<td>Secondary Material</td>
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<tr>
<td></td>
<td>For Mocha use PANTONE 16-1210 TPX or for Blue Gray use PANTONE 14-4506 TPX</td>
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<td><strong>Roof</strong></td>
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<td>Sloped Areas</td>
<td>For Metal Green use PANTONE 16-6216 TPX</td>
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<td>Soffit</td>
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<td>Gutters and D.S.</td>
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<td>Awnings and Canopies</td>
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<td>Stair or Balcony Railings, Balusters and related Trim</td>
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<td>Fire Escapes</td>
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<td>Grilles and Louvers</td>
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<td>Coping</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
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<tr>
<td>Roof Ventilators</td>
<td>Blend to match roof</td>
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<tr>
<td>Courtyard Enclosure Walls, Retaining Walls, Fences, Dumpster Enclosures</td>
<td>Red Brick or for Dark Brown use PANTONE 18-1027 TPX</td>
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<tr>
<td>Porch Crawl Space Enclosure</td>
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# EXTERIOR COLOR CHART

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<td></td>
<td></td>
</tr>
<tr>
<td>Base (primary) Material</td>
<td>Tan Brick or native stone</td>
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<td></td>
</tr>
<tr>
<td>Secondary Material</td>
<td>For Almond use PANTONE® 11-0907 TPX or for Custard use PANTONE 12-0910 TPX</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>For Mocha use PANTONE 16-1210 TPX</td>
<td></td>
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</tr>
<tr>
<td><strong>Roof</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sloped Areas</td>
<td>Metal Bronze or Terracotta</td>
<td></td>
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<tr>
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<td>Clay Terracotta</td>
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<td>Wood: For White use PANTONE 11-0604 TPX</td>
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<td>Steel: For Dark Brown use PANTONE 18-1027 TPX</td>
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<td>Required Color Standard</td>
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<td>Coping</td>
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<tr>
<td>Roof Ventilators</td>
<td>Blend to match roof</td>
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<td><strong>Related Site Structures</strong></td>
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<td>Red Brick or For Dark Brown use PANTONE 18-1027 TPX</td>
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<tr>
<td>Porch Crawl Space Enclosure</td>
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# EXTERIOR COLOR CHART

## Plains USA

<table>
<thead>
<tr>
<th>Building Design Element</th>
<th>Required Color Standard</th>
<th>Color Sample (See Note 3)</th>
<th>Notes (Hyperlinked)</th>
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<td><strong>Base (primary) Material</strong></td>
<td>Red Brick, or limestone neutral gray tones</td>
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<td><strong>Sloped Areas</strong></td>
<td>Clay Terracotta</td>
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<tr>
<td></td>
<td>Fiberglass Shingle Gray/White</td>
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<td><strong>“Flat” Areas</strong></td>
<td>White</td>
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<td><strong>Roof</strong></td>
<td>Wood: For Shell White use PANTONE 11-0604 TPX</td>
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<td>Steel: For Dark Brown use PANTONE 18-1027 TPX</td>
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<td><strong>Doors</strong></td>
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<td><strong>Storm Doors</strong></td>
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<tr>
<td><strong>Window</strong></td>
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<tr>
<td><strong>Fascia</strong></td>
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<td><strong>Soffit</strong></td>
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<tr>
<td><strong>Gutters and D.S.</strong></td>
<td>For Brown use PANTONE 16-1221 TPX</td>
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<tr>
<td><strong>Awnings and Canopies</strong></td>
<td>For Custard use PANTONE 12-0910 TPX</td>
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<tr>
<td><strong>Stair or Balcony Railings, Balusters, and related Trim</strong></td>
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</tbody>
</table>
### Building Design Element | Required Color Standard | Color Sample (See Note 3) | Notes
---|---|---|---
**Trim Items**
- Fire Escapes | For Dark Brown use PANTONE® 18-1027 TPX | |  
- Grilles and Louvers | For Brown use PANTONE 16-1221 TPX | |  
- Coping | For Brown use PANTONE 16-1221 TPX | |  
- Roof Ventilators | Blend to match roof | |  
**Related Site Structures**
- Courtyard Enclosure Walls, Retaining Walls, Fences, Dumpster Enclosures | For Dark Brown use PANTONE 18-1027 TPX or Red Brick | |  
- Porch Crawl Space Enclosure | White | |  

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<td><strong>Walls</strong></td>
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<td>Building Design Element</td>
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<td>Grilles and Louvers</td>
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<td>Coping</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
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<tr>
<td>Roof ventilators</td>
<td>Blend to match roof</td>
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<td>Courtyard Enclosure Walls, Retaining Walls, Fences, Dumpster Enclosures</td>
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<tr>
<td>Porch Crawl Space Enclosure</td>
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# EXTERIOR COLOR CHART

## Pacific Ocean

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EXTERIOR COLOR CHART

Alaska

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<tr>
<td>Awnings and Canopies</td>
<td>For Custard use PANTONE 12-0910 TPX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stair or Balcony Railings, Balusters, and related Trim</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handrails</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Design Element</td>
<td>Required Color Standard</td>
<td>Color Sample</td>
<td>Notes</td>
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</tr>
<tr>
<td>Fire Escapes</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td><img src="image" alt="Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>Grilles and Louvers</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td><img src="image" alt="Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>Coping</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td><img src="image" alt="Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>Roof Ventilators</td>
<td>Blend to match roof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courtyard Enclosure Walls, Retaining Walls, Fences, Dumpster Enclosures</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td><img src="image" alt="Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>Porch Crawl Space Enclosure</td>
<td>White</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

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*Installation: Enter notes where applicable. Tab to expand note listings.*

**Note 2**  
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## EXTERIOR COLOR CHART

### Far East (Japan and Korea)

<table>
<thead>
<tr>
<th>Building Design Element</th>
<th>Required Color Standard</th>
<th>Color Sample</th>
<th>Notes (Hyperlinked)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Walls</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base (primary) Material</td>
<td>Red Brick</td>
<td><img src="image" alt="Red Brick Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>Secondary Material</td>
<td>For Almond use PANTONE 11-0907 TPX or for Custard use PANTONE 12-0910 TPX</td>
<td><img src="image" alt="Almond Color Sample" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For Mocha use PANTONE 16-1210 TPX</td>
<td><img src="image" alt="Mocha Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Roof</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sloped Areas</td>
<td>For Metal Green use PANTONE 16-6216 TPX</td>
<td><img src="image" alt="Metal Green Color Sample" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clay Terracotta</td>
<td><img src="image" alt="Clay Terracotta Color Sample" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fiberglass Shingle Gray/White</td>
<td><img src="image" alt="Fiberglass Shingle Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>“Flat” Areas</td>
<td>White</td>
<td><img src="image" alt="White Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Doors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td>For White use PANTONE 11-0604 TPX</td>
<td><img src="image" alt="White Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td><img src="image" alt="Dark Brown Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Storm Doors</strong></td>
<td>White</td>
<td><img src="image" alt="White Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Door &amp; Window Frames</strong></td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td><img src="image" alt="Brown Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Storm Window or Sash</strong></td>
<td>White</td>
<td><img src="image" alt="White Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Window</strong></td>
<td>White</td>
<td><img src="image" alt="White Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Fascia</strong></td>
<td>White</td>
<td><img src="image" alt="White Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Soffit</strong></td>
<td>White</td>
<td><img src="image" alt="White Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Gutters and D.S.</strong></td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td><img src="image" alt="Brown Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Awnings and Canopies</strong></td>
<td>For Custard use PANTONE 12-0910 TPX</td>
<td><img src="image" alt="Custard Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Stair or Balcony Railings, Balusters, and related Trim</strong></td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td><img src="image" alt="Dark Brown Color Sample" /></td>
<td></td>
</tr>
<tr>
<td><strong>Handrails</strong></td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td><img src="image" alt="Brown Color Sample" /></td>
<td></td>
</tr>
<tr>
<td>Building Design Element</td>
<td>Required Color Standard</td>
<td>Color Sample (See Note 4)</td>
<td>Notes</td>
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<tr>
<td>-------------------------</td>
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<td>---------------------------</td>
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</tr>
<tr>
<td>Fire Escapes</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td>![Color Sample]</td>
<td></td>
</tr>
<tr>
<td>Grilles and Louvers</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td>![Color Sample]</td>
<td></td>
</tr>
<tr>
<td>Coping</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td>![Color Sample]</td>
<td></td>
</tr>
<tr>
<td>Roof Ventilators</td>
<td>Blend to match roof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courtyard Enclosure Walls, Retaining Walls, Fences, Dumpster Enclosures</td>
<td>For Dark Brown use PANTONE 18-1027 TPX or Red Brick</td>
<td>![Color Sample]</td>
<td></td>
</tr>
<tr>
<td>Porch Crawl Space Enclosure</td>
<td>White</td>
<td></td>
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</table>

**NOTES:**

<table>
<thead>
<tr>
<th>Note</th>
<th>Description</th>
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<tbody>
<tr>
<td>Note 1</td>
<td><em>Installation:</em> Enter notes where applicable.</td>
</tr>
<tr>
<td>Note 2</td>
<td><em>Installation:</em> Tab to expand note listings.</td>
</tr>
<tr>
<td>Note 3</td>
<td>Identify type, color, and texture of local brick and stone, to include mortar color and joint style.</td>
</tr>
<tr>
<td>Note 4</td>
<td>Color samples are electronic approximations of colors, which should not be construed as accurately representing the color standard. Paint shall match the PANTONE color number.</td>
</tr>
<tr>
<td>Note 5</td>
<td>The colors shown here and throughout these guidelines, except as shown in Appendix L (supplemental Page L-4a), have not been evaluated by Pantone, Inc. for accuracy and may not match the PANTONE Color Standards. Consult current PANTONE for architecture and interiors color publications for accurate color. PANTONE® and other Pantone, Inc. trademarks are the property of Pantone, Inc.</td>
</tr>
</tbody>
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**EXTERIOR COLOR CHART**

<table>
<thead>
<tr>
<th>Building Design Element</th>
<th>Required Color Standard</th>
<th>Color Sample (See Note 3)</th>
<th>Notes (Hyperlinked)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base (primary) Material</td>
<td>New walls shall be constructed of sand limestone using dimensions according to heating calculations. New and existing walls (to be covered) shall be of plaster carrying construction, mesaleithe, or equal #31643.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td></td>
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</tr>
<tr>
<td>Secondary Material</td>
<td>Cementitious materials consist of mineral stucco, synthetic stucco, quick-mix, or concrete. The mineral stucco, synthetic stucco, and concrete colors shall be Almond, use PANTONE 11-0907 TPX. The poured-in-place concrete with paint finish shall be the same as concrete color. Tilt-up concrete shall have a paint finish. Pre-cast concrete shall have an integral color or paint finish.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Metal siding where exposed, shall be painted with PANTONE 13-1013 TPX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roofs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sloped areas</td>
<td>For Metal Green use PANTONE 16-6216 TPX</td>
<td></td>
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<tr>
<td></td>
<td>Clay Tile</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Concrete roof tile manufactured by “BRAAS” or equal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Flat” areas</td>
<td>White</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doors</td>
<td>Altweiss, Color 0029</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steel: For Dark Brown use PANTONE 18-1027 TPX</td>
<td></td>
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</tr>
<tr>
<td>Window Frame or Sash</td>
<td>Altweiss, Color 0029</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fascia</td>
<td>White</td>
<td></td>
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</tr>
<tr>
<td>Soffit</td>
<td>White</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gutters and D.S.</td>
<td>Altweiss, Color 0029</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Awnings and Canopies</td>
<td>For Custard use PANTONE 12-0910 TPX</td>
<td></td>
<td></td>
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<td>Stair or Balcony Railings, Balusters, and related Trim</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Handrails</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Building Design Element

<table>
<thead>
<tr>
<th>Building Design Element</th>
<th>Required Color Standard</th>
<th>Color Sample (See Note 3)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fire Escapes</td>
<td>For Dark Brown use PANTONE 18-1027 TPX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grilles and Louvers</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td></td>
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</tr>
<tr>
<td>Coping</td>
<td>For Brown use PANTONE 16-1221 TPX</td>
<td></td>
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</tr>
<tr>
<td>Roof Ventilators</td>
<td>Blend to match roof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courtyard Enclosure Walls,</td>
<td>Red Brick or For Dark Brown use PANTONE 18-1027 TPX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retaining Walls, Fences,</td>
<td></td>
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<td></td>
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<tr>
<td>Dumpster Enclosures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porch Crawl Space Enclosure</td>
<td>White</td>
<td></td>
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</tbody>
</table>

## NOTES:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Note 2</td>
<td>Identify type, color, and texture of local masonry stone, to include mortar color and joint style.</td>
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<td>Note 3</td>
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</tbody>
</table>

## ROOFS

Roofs should be red and be of the following material:

- Fiberglass face room shingles manufactured by “Eternit” or equal,
- Concrete roof tile manufactured by “BRAAS” or equal, or
- Clay roof tile or equal.
DOORS, WINDOWS, and ACCENTS

Doors and accent elements such as windows, gutters, and pilasters shall be painted Altweiss, Color 0029.
COLOR BOARD for the IDS APPENDIX L ~ HARD COPY VERSION

This sheet is a hard copy supplement for Appendix L of the Army Installation Design Standards. The color squares shown here are accurate representations of the PANTONE® for architecture and interiors color numbers indicated. The color names shown are used only by the Army and differ from the official PANTONE color names shown in PANTONE color publications. PANTONE® is the property of Pantone, Inc. ©Pantone, Inc., 2004. All rights reserved.

- PANTONE 11-0604 TPX SHELL
- PANTONE 11-0907 TPX ALMOND
- PANTONE 12-0910 TPX CUSTARD
- PANTONE 12-4607 TPX PASTEL SKY
- PANTONE 13-1009 TPX TAN
- PANTONE 13-1013 TPX ALLSPICE
- PANTONE 13-1107 TPX BEIGE
- PANTONE 14-4506 TPX BLUEGRAY
- PANTONE 15-1306 TPX NATURAL
- PANTONE 15-1309 TPX NATURAL
- PANTONE 15-5704 TPX GRAY
- PANTONE 16-1210 TPX MOCHA
- PANTONE 16-1221 TPX BROWN
- PANTONE 16-6216 TPX METAL GREEN
- PANTONE 18-1027 TPX DARK BROWN
- PANTONE 18-1444 TPX SALSA
- PANTONE 19-1540 TPX MAROON
- PANTONE 14-4318 TPX SKY BLUE
- PANTONE 18-1222 TPX NUTMEG BROWN

03 May 2004
**Installation:** Expand or modify entries as necessary for particulars within regional area or specific objectives of the Army, Region, Command, or installation.

**M.1 INTRODUCTION**

M.1.1 Military Planning and Design

M.1.1.1 Most of the history and literature about the military does not deal with the topic of Army facility planning and design processes. However, to plan for the future development of an Army installation, it is necessary to go back and attempt to understand what has taken place there in the past.

M.1.1.2 In the development of its policies, the Army had to deal with the question of how buildings relate to one another by both use and layout and by architectural characteristics. At least in its earliest phases, this development was not always a conscious formulation of policy; so much as it was the immediate response to a given situation. Over the years, there have been different forces affecting the process of military planning in this country. As illustrated by the various districts and zones on (Installation Name).

**M.2 HISTORIC PRESERVATION REGULATIONS**

M.2.1 The Army’s management of historic properties is pursuant to the duties and responsibilities established by Congress under the National Historic Preservation Act (NHPA) of 1966 and its
subsequent amendments. This act committed Federal agencies to a program of identification and protection of historic properties on the land they own. The NHPA established the Advisory Council on Historic Preservation (ACHP) to “advise the President and the Congress on matters relating to historic preservation; (and to) recommend measures to coordinate activities of Federal, State, and local agencies.” (16 U.S.C. 470j)

M.2.2 The NHPA also created the National Register of Historic Places to designate publicly or privately owned resources and to encourage identification and planning which promotes the compatible use of these properties. The National Register is the official listing of the nation’s historic and cultural resources considered worthy of preservation. It includes “districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture”. (16 U.S.C. 470a)

M.2.3 The NHPA has established a number of procedural steps, which Federal agencies must meet in order to comply with the intent of the law. This is set forth in Section 106 of the NHPA which requires that: “the head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, buildings, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking.” (16 U.S.C. 470f)

M.2.4 Pursuant to its authority in overseeing the nation’s historic preservation programs, the Department of the Interior has developed regulations which amount to a set of acceptable standards for work on properties listed in or eligible for listing in the National Register. The Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation act as a guide to the Advisory Council and State Historic Preservation Offices in their procedural review of Federal undertakings. These guidelines should also act as standards for all Federal agencies as they commence planning for any undertaking, which has the potential to trigger Section 106 review, thus assuring that all
proposed projects would meet Advisory Council and NHPA requirements.

M.2.5 Federal agencies must comply with the NHPA by following a series of steps detailed in 36 CFR 800. The Army further explains its policies and procedures in Army Regulation (AR) 200-4, Cultural Resources Management and Department of the Army Pamphlet (DA PAM) 200-4, Cultural Resources Management. This Installation Design Guideline is intended to be used in conjunction with the above regulations as well as with the (Installation Name) Integrated Cultural Resources Management Plan (ICRMP).

M.2.6 The recently developed Army Alternate Procedures (AAP) provide a new method for managing historic properties. The AAP, a streamlined approach to Section 106 of the National Historic Preservation Act, now allows installations to manage historic properties programmatically rather than on a project-by-project review. These procedures also enable installations to leverage existing Army and DoD program requirements while internally managing historic properties in a more efficient and cost effective manner.

M.3 STANDARDS AND GUIDELINES

M.3.1 Rehabilitation of Historic Properties. Design and renovation guidelines for historic districts, such as those within the (Installation Name) are of necessity much broader than design guidelines for single structures. Such guidelines must not only address the appropriate architectural image (style, material, etc.) for proposed new buildings, they must also address how a proposed action within the historic district will impact its integrity. By this it is meant, how any new work will affect the original design intent of the given historic area.

M.3.1.1 New work should not:

M.3.1.1.2 Conflict with the existing architectural character. For example, it should not:

- Be larger in mass or taller than the existing historic structures.

- Be of a color or material that conflicts visually with the predominant historic material used in the area.
• Destroy the historic fabric of any existing structures or landscape features, which are essential character defining elements within the district.

• Destroy the spatial relationship between or among historic buildings designed as a grouping; this includes the regular spacing of buildings within a group, as well as views from one to the other or into the grouping as a whole.

M.3.1.2 New work should:

M.3.1.2.1 Seek to enhance and protect the historic quality and existing resources. For example:

• Conduct a survey examining the level of use existing facilities prior to determining the need for new construction.

• Follow the Standards and Guidelines for Historic Preservation as recommended by the Secretary of the Interior.

M.3.1.2.2 Provide necessary modern conveniences as unobtrusively as possible. For example, it should:

• Site new construction so that it does not destroy existing building relationships or configurations.

• Scale new buildings down so as to minimize their visual impact.

• Place parking to the rear of historic buildings.

• Landscape parking areas and modern mechanical equipment so as to screen them from view.

M.3.1.2.3 Phase out (gradually eliminate) existing intrusions. For example, it should:

• Demolish structures designated, as intrusions on the National Register Inventory when they are no longer needed.

• Restore buildings, which have been altered by inappropriate color schemes, replacement windows, porch enclosures, etc.
M.3.2 **Treatment of Historic Fabric.** The most effective way to preserve historic properties is to keep them in use and to consistently maintain them. When buildings and grounds are consistently used for their intended purposes and regular maintenance is conducted, there is rarely a need for extensive preservation work. Only when they are misused, underused or left vacant for long periods of time does large-scale rehabilitation become necessary. It follows that if a regular maintenance program is put into effect once a property has been appropriately renovated, another major rehabilitation will rarely be required.

M.3.3 **Standards for Historic Preservation Projects**

M.3.3.1 **Compatible use of historic sites and structures.** Every reasonable effort should be made to use a historic structure or site for its originally intended purpose or to provide a compatible use. The use should be compatible in the sense that it involves minimal alteration to the property and/or has no adverse effect upon its historic integrity. Use of the site and structure should be regulated to prevent alterations that are potentially damaging to historic fabric and/or cultural context (Fig. M.X).

M.3.3.2 **Retention of character defining features.** Distinguishing stylistic or character defining features and examples of skilled craftsmanship should not be destroyed, altered, or removed from a historic site or structure. All such fabric should be treated with sensitivity and preserved in its original context and form (Fig. M.X).

M.3.3.3 **Treatment of deteriorated historic fabric.** Deteriorated historic fabric should be repaired rather than replaced whenever possible. When replacement is unavoidable, new material, whether man-made or natural, should match the existing fabric in composition, design, color, texture, and other visual/structural qualities.

M.3.3.4 **Documentation of missing historic elements.** Replacement of missing historic elements should be based on the accurate duplication of features known to have existed and substantiated by historic pictorial and/or physical evidence and not on conjecture, nor simply on the example of similar treatment found on other structures or sites of the same period or region.

M.3.3.5 **Retention of historic alterations.** Changes to a historic structure or site, which have occurred over the course of time, may provide evidence of important social or cultural processes. As such
they should be respected and their potential significance carefully evaluated.

**M.3.3.6 Unacceptable alterations.** Historic sites and structures should be recognized as products of their own time and as part of an important cultural process. Alterations which have no historical basis or which destroy the authenticity of the place are discouraged.

**M.3.3.7 Acceptable alterations and additions.** When possible, alterations and new additions to historic structures or sites should be done in such a manner as to leave the essential form and integrity unimpaired.

**M.3.3.8 Contemporary design in a historic context.** Contemporary design for additions to existing historic sites or districts should not be discouraged if such design is compatible with the massing, proportions, scale, materials, color, views, and general contextual relationships of the place.

**M.3.3.9 Surface cleaning methods.** Surface cleaning of structures or buildings should be undertaken with the gentlest possible means, and only when cleaning is essential to the preservation of the buildings. Cleaning methods, such as sand blasting, which could damage historic material or speed their deterioration, are discouraged.

**M.3.3.10 Archaeological resources.** All treatment work, which potentially affects surface or sub-surface pre-historic or historic archaeological resources, should be coordinated with an archaeologist.

**M.3.3.11 Historic preservation and maintenance.** The guidelines contained within this IDG are general in nature. The IDG must be utilized in conjunction with the Installation ICRMP.

**M.3.4 Guidelines for Historic Preservation Projects.**

**M.3.4.1 Roof Guidelines**

- Preserve existing historic roofing. Repair and patch with matching materials.

- All roofs should receive an annual inspection. Repair and patch all materials as needed and clean out all gutters and drains.

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*Fig. M.X - Replace or Restore Roofs with Historical Materials*
• When full replacement of the roof becomes necessary, replace or restore with historic materials.

• Roof details. Retain and/or maintain all existing chimneys, ventilators, vents, louvers and decorative elements such as brackets, dentils, and cornices. When possible, restore missing decorative elements.

M.3.4.2 Wall Guidelines

• Limestone and brick masonry.
  o Clean only when necessary using the gentlest possible means.
  o Repair or replace deteriorated or missing units as needed.

• Stucco.
  o Repair damaged or deteriorated stucco.
  o Repaint only when necessary with appropriate color based on analysis of historic paint.

• Wood.
  o Retain or repair wood siding; where replacement is necessary, match existing clapboards in width and species.
  o Repaint only as need to maintain moisture protection.
  o Use color scheme based on analysis of existing paint layers.

M.3.4.3 Porch Guidelines

• Retain or maintain existing original porches.

• Remove historically inappropriate porches.

• Where possible, restore original porches that have been removed or enclosed.
M.3.4.4 Window Guidelines

- In most historic districts or buildings, windows constitute a highly visible design element as they make up a large percentage of façades.

- If building an addition or altering the building, maintain height configuration of windows.

- Retain window size and fenestration pattern when replacing windows or altering the building.

- If replacing windows, preserve frame material or use historically accurate reproductions. Avoid replacing original frames with aluminum frames.

- Restore historic windows where non-historic replacement windows have been used.

- The window manufacturing industry can replicate and/or reproduce most all types and sizes of windows to match existing historic windows. In many cases, matching replacement windows are available as stock items.

M.3.4.5 Door Guidelines

- Although not usually as visually overpowering as windows, main entrance doorways are also important façade details. As a design element, decorative doors have stylistic features that belong to the particular era for which they were designed.

- Retain or maintain existing historic doors.

- If replacing doors, preserve frame material or use historically accurate reproductions.

- If building an addition or altering the building, maintain the size of the door opening.

- Restore all main entranceways by reinstalling appropriate frames.
M.3.4.6 Color Guidelines

- If historic buildings must be repainted before an accurate color scheme is developed, a very conservative approach should be followed. Repaint to match the existing colors or colors that can be documented to have been used on that building.

- Utilize a qualified historic paint color specialist for an inventory and analysis of the paint layer sequences for all building groupings.

- Establish a rotating schedule for the painting and cleaning of each building.

M.3.4.7 Painting Guidelines

- Do not undertake a paint job until any problems with leaking water have been solved. All gutters and downspouts should be repaired and be in good operating condition.

- Only repaint when existing coat is no longer performing, as excessive coats of paint create a thick film, which obscures detail.

M.3.4.8 Handicap and Safety Access Guidelines

- As a general rule, buildings listed in or determined eligible for listing in the National Register may receive special consideration for meeting safety and accessibility requirements. Any modifications required to bring a historic structure in compliance with safety and accessibility codes should be carefully planned and undertaken so that they do not adversely affect the design of main entrances or principal facades.

- Where possible, avoid alterations to the main façade and principal doorways.

- Place or install new ramps, lifts, and any added fire escapes on secondary building facades such as, to the side or rear of the building.

- Locate new doorways at the rear or side of the building.
Required protective railings on ramps, stairs, steps, and lifts should match existing porch railings.

**M.3.4.9 Mechanical Equipment Guidelines**

- In many cases within historic districts, mechanical equipment is located outside of the building. When historic structures are renovated and mechanical systems are upgraded, equipment placement should be planned in order to make the least visual impact.

- Where possible, locate mechanical equipment within the building.

- Screen necessary surface equipment with vegetation.

- When large groups of buildings are upgraded as one project, consider the use of a remote system.

**M.3.4.10 Guidelines for Additions**

- In general, additions should follow all of the guidelines for new construction within historic districts; but, because their proximity makes the potential for damage to historic fabric even greater, there are additional principles that should be followed.

- Avoid changes that impact primary facades.

- Note that some highly visible freestanding buildings may not have a secondary facade, and thus additions are not advisable.

- Scale down additions so that it makes the least visual impact.

- Design should establish a clear and obvious difference between the existing historic structure and the new addition.

**M.3.4.11 Force Protection.** These guidelines should be used in conjunction with the [Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](https://www.dtic.mil/dtic/tr/fulltext/u2/a326653.pdf) and the Force Protection Design Standards of this Army Installation Design Guide and Standards.
M.4 ARMY STANDARDS

- Army Regulation (AR) 200-4, Cultural Resources Management
- Department of the Army Pamphlet (DA PAM) 200-4, Cultural Resources Management
- The Secretary of the Interior’s Standards for the Treatment of Historic Properties

M.5 REFERENCES

- Advisory Council on Historic Preservation
- United States Army Environmental Center Historic Buildings
- United States Army Environmental Center Native Indian Affairs
- United States Army Environmental Center Archeology
INTRODUCTION

N.1 The following set of housekeeping rules consists of a list of general and public rules that are applicable to the administrative office work areas throughout the installation. Organizations should make every effort to assure that all personnel are familiar with the facilities housekeeping rules. An organized, well kept working area that is neat and clean contributes to the visual harmony of the work area and fosters work efficiencies.

N.2 Housekeeping Rules (Example). Modify as appropriate.

Housekeeping Rules for (Enter Name of Organization)

GENERAL RULES:

1. Alterations: Employees shall not mark, paint, drill, damage, string wires within, or in any way deface any part of the building. Employees will not install or permit the installation of any awnings, shades, Mylar films or sun filters on windows. Employees will not obstruct, alter, or in any way impair the efficient operation of the heating, ventilating, air conditioning, electrical, fire safety, or lighting systems, nor shall the employee tamper with or change the setting of any thermostat or temperature control valve in the building. Employees shall not cover or block air ducts or vents.

2. Cleanliness: Employees shall exercise their best efforts to keep workstations and common areas, i.e., hallways, corridors, team rooms, etc., clean and free form rubbish. No employee shall cause any unnecessary labor on the part of cleaning personnel due to carelessness or indifference in the preservation of good order and cleanliness. It is highly recommended that employees use covered cups when transporting liquids to and from the coffee bars. Employees shall not bring any substance into the building that might add an undue burden to the cleaning or maintenance of the premises, or the building.
3. **Carpet:** Carpet stains and/or damage should be reported to (Enter Point of Contact [POC]).

4. **Energy Conservation:** Turn off systems furniture lighting, conference room lights, private office lights and equipment, etc. when not in use, especially at the end of the day. During non-business hours, employees shall limit the use of lighting and equipment to areas occupied.

5. **Lighting:** Do not move and/or modify any overhead lighting fixtures above workstations. One task light may be placed in a workstation.

6. **Vertical and Venetian Blinds:** Blinds are to be left in fully extended position at all times. Blades shall be positioned so as to permit a good level of natural lighting and shall only be closed for the purposes of sun control and at night for privacy. Only the wands will be used for adjustments. Items shall not be placed or stored on windowsills other than small plants as described hereinafter.

7. **Signage:** No signs, advertisements or notes shall be painted or affixed on or to any window, door, restroom conference/team room or other part of the building unless approved by (Enter POC). Bulletin boards for posting of unofficial material are restricted to communal areas such as break rooms and coffee bars.

8. **Bicycles:** Employees shall not bring bicycles or motorcycles into the office environment, but shall be left secured in an upright position in areas designated for that purpose.

9. **Aerosol Sprays:** The use of aerosol products such as air fresheners, hair sprays, etc., in the work environment should be avoided.

10. **Maintenance:** All requests for maintenance on furnishings, or building systems or components should be reported to (Enter POC [there may be more than one POC]).

11. **Smoking:** The use of tobacco products inside any Army facility is strictly prohibited. Smoking of tobacco products may only occur in designated areas where proper ash receptacles, which are kept free of trash and debris, are located.

**PUBLIC SPACES:**

1. **Eating in Work Areas:** Eating in work areas can contribute to pest infestation and an unsightly appearance. If eating at your desk, please ensure trash is discarded daily. Perishable food items should not be stored in the employees’ work area. Perishable foods are to be kept refrigerated.

2. **Appliances** (e.g., Heaters/Refrigerators/Microwaves/Coffee Pots): Refrigerators and microwaves are not permitted in work areas. One personal fan, not to exceed 8” in diameter may be placed in a workstation. Exceptions to accommodate health problems may be submitted to (Enter POC).
3. **Centralization:** Copiers, faxes, scanners, printers, etc., will be centralized and networked to the maximum extent possible. Personal office equipment will be provided on an exception basis only.

4. **Office Accessories:** All office equipment and other devices of any electrical or mechanical nature shall be placed on an area of the work surface that best accommodates the prevention/elimination of any vibration, noise or annoyance to others. Employees shall not construct, maintain, use or operate any equipment of machinery that produces music, sound, noise, pictures, or lighting which is audible or visible beyond their workstation.

5. **Office Wall Mountings:** Only framed items shall be hung on walls. No artwork or other displays may be placed or hung on fixed or temporary walls/partitions, other than in private offices, without approval by (Enter POC). The use of tape, pushpins, or other devices to affix items to walls is prohibited.

6. **Plants:** Plants must be contained in appropriate leak-proof non-corroding containers such as ceramic jardinières or flower pots with saucers and shall be kept within workstations and not affixed in any way to the workstation, partitions, floors, or ceiling as outlined in the guidance detailed elsewhere in this document; this prohibition extends to trailing vines. Small plants that do not interfere with the normal operation of window blinds may be placed on windowsills. Watering of plants shall not subject any government equipment to risk of damage.

7. **Speakerphones:** The use of speakerphones is discouraged and should be restricted to those occasions when absolutely necessary. Concerted efforts must be made to utilize team rooms when speakerphone conversations are required.

8. **Trash:** The janitorial contractor will discard only items in wastebaskets or items clearly labeled “TRASH”. Do not place trash in the corridors, hallways, stairwells, or other common areas.

9. **Workstation Reconfiguration:** Workstations will not be reconfigured, modified, or altered in any way by the occupant.

10. **Workstation Guidelines:** Every employee shall make a concerted effort to keep workstations clean, uncluttered, and professional in appearance. Avoid placing papers and other “hard copy” materials on the wall of the workstation and the accumulation of excessive pictures/cartoons/mementos. The storage of papers, boxes, and files on floors is prohibited. Materials are not to be hung on the outside panels of workstations.

   a. **Above the Panels:** Nothing will be placed above the panel height of the workstations or hung from the ceiling. Nothing will be stacked on the tops of flipper doors, map files, filing cabinets, towers, etc.

   b. **Cabling:** No temporary cabling for electrical, information technology, or communications is allowed. Requests for alterations must be submitted to (Enter POC). This prohibition includes extension cords; surge protectors are permitted. Wiring is to be contained in cable trays and off the floors.
11. Care of Furniture and Furniture Systems

a. Laminate Surfaces – To clean laminate tops, use a soft cloth or non abrasive sponge dampened in a solution of mild detergent and warm water. Remove residue of cleaning solution with a soft cloth wrung out in clean water. Dry with a soft cloth.

b. Steel and Painted Metal Surfaces – Panel trim, panel poles, painted flipper doors, and other parts of flipper doors should be cleaned with a soft damp cloth and thoroughly dried with a soft dry cloth. For soiled areas a mild detergent solution in warm water may be used.

c. Fabric – For information on how to remove spots from fabric panels on workstations, contact (Enter POC).
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<thead>
<tr>
<th>Botanical Name</th>
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<th>Characteristics</th>
<th>Use</th>
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### PLANT SELECTION LIST

#### Plant Material Suitability Matrix

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<td><strong>GROUNDCOVERS/VINES</strong></td>
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**P.1 General.** The various facility types are listed with contact information according to the Center of Standardization (COS) responsible for development of standards for that facility type.

**P.3 Specific Contact Information.** For more specific contact information, such as POC with email address and telephone number, refer to the [IDS Newsletter](https://secureapp2.hqda.pentagon.mil/acsimnews/) under the heading “Standardization Program POCs”. An Army Knowledge Online (AKO) account will be required to access the information which includes the Category Code, Army Proponent, ACSIM Proponent, HQUSACE POC, and HQIMA POC.
# Army Facilities Standardization Program
## Centers of Standardization

<table>
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<tr>
<th>Assigned Center</th>
<th>Facility Type</th>
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<tr>
<td><strong>U.S. Army Engineering and Support Center, Huntsville</strong></td>
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<tr>
<td>Attn: CEHNC-ED-CS-A and IS</td>
<td>Child Development Center-Infant/Toddlers</td>
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<tr>
<td>P.O. Box 1600</td>
<td>Child Development Center Playground</td>
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<tr>
<td>Huntsville AL 35807</td>
<td>Child Development Center – 6 to 10 Year Olds</td>
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<tr>
<td>Telephone: 256-895-1673/1672/1535</td>
<td>Physical Fitness Facilities</td>
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<td></td>
<td>Fire Station</td>
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<td>Hazardous Material Storage Facility</td>
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<td>Outdoor Sports Facility</td>
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<td>Close Combat Tactical Trainer (CCTT)</td>
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<td>Urban Assault Course (UAC) replaces: Military Operations Urban Terrain (MOUT)</td>
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<td>Training Range</td>
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<td>Bowling Center (RFP)</td>
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<td>Army Community Service Centers</td>
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<td>Consolidated Fire/Police/Safety Facility</td>
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<td><strong>U.S. Army Engineer District, Louisville</strong></td>
<td>Army Reserve Center</td>
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<tr>
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<tr>
<td>600 Martin Luther King Jr. Place</td>
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<tr>
<td>Louisville, KY 40202</td>
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<tr>
<td>Tel: 502-315-6250</td>
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<td><strong>U.S. Army Engineer District, Norfolk</strong></td>
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<td>803 Front Street</td>
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<td>Norfolk, VA 23510</td>
<td>Family Housing (RFP)</td>
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<td>General Instruction Building</td>
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<td>Information Systems Facility</td>
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<td>Troop Issue Subsistence Activity Facility (TISA)</td>
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<td>Central Issue Facility</td>
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<td>General Purpose Warehouse</td>
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<td><strong>U.S. Army Engineer District, Omaha</strong></td>
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<td>ATTN: CENWO-ED-DG/PM-M</td>
<td>Chapel Family Life Center</td>
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<td>215 North 17th Street</td>
<td>Religious Education Facility</td>
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<td>Omaha, NE 68102</td>
<td>Small Site Chapel</td>
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<td>Telephone: 402-221-4552/443</td>
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<tr>
<td>Telephone: 251-394-3600</td>
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<tr>
<td>U.S. Army Engineer District, Savannah</td>
<td>Company Operations Facility (COF)</td>
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<tr>
<td>ATTN: CESAS-EN-E</td>
<td>Military Entrance Processing Station (MEPS)</td>
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<td>P.O. Box 889</td>
<td>Tactical Equipment Maintenance Facility (TEMF)</td>
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<td>Savannah, GA 31402</td>
<td>Unaccompanied Enlisted Personnel Housing (UEPH), New &amp; Modernization</td>
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<tr>
<td>Telephone: 912-652-5212</td>
<td>One Station Unit Training (OSUT) Barracks</td>
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<td>Unaccompanied Officer / Sr. Enlisted / Quarters</td>
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<td>Unaccompanied Officer Quarters, Transient</td>
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<td>Brigade / Battalion HQ</td>
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<td>*Advanced Individual Training (AIT) Barracks</td>
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<td>U.S. Army Engineer District, Tulsa</td>
<td>*Advanced Individual Training (AIT) Barracks</td>
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<tr>
<td>ATTN: CESWT-EC-D</td>
<td>*Basic Combat Trainee (BCT)</td>
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<tr>
<td>1645 S. 101ST East Avenue</td>
<td>Reception Barracks</td>
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<tr>
<td>Tulsa, OK 74128</td>
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<td>Telephone: 918-669-7033</td>
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*AIT & BCT to be transferred to Savannah, upon completion by Tulsa.

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<td>Golf Courses</td>
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<td>Recreational Lodging</td>
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Q.1 STANDARDS AND REFERENCES

Standards and References for the Army Installation Design Standards (IDS).

Q.1.1 Chapter 2, Site Planning Design Standards

Q.1.1.1 Army Standards

- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)
- AR 200-2, Environmental Effects of Army Actions
- AR 210-20, Master Planning for Army Installations
- AR 415-15, Army Military Construction Program Development and Execution
- AR 420-70, Buildings and Structures

Q.1.1.2 References

- UFC 1-300-05A, Installation Support
- UFC 3-210-01A, Design: Area Planning, Site Planning, and Design
- UFC 3-210-06A, Design: Site Planning and Design
- UFC 3-210-10, Design: Low Impact Developing Manual
- UFC 3-230-15FA, Design: Subsurface Drainage Facilities for Airfields and Heliports
- UFC 3-230-16FA, Design: Drainage and Erosion Control Structures for Airfields and Heliports
- UFC 3-230-17FA, Design: Drainage for Areas Other than Airfields
- UFC 3-250-01FA, Design: Pavement Design for Roads, Streets, Walks and Open Storage Areas
- UFC 3-250-18FA, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas
- UFC 3-260-02, Design: Pavement Design for Airfields
- UFC 3-400-01, Design: Energy Conservation
- Whole Building Design

Q.1.2 Chapter 3, Building Design Standards

Q.1.2.1 Army Standards

- AR 140-483, Army Reserve Land and Facilities Management
- AR 200-4, Cultural Resources Management
- AR 350-19, The Army Sustainable Range Program
- AR 420-70, Buildings and Structures
- UFC 1-300-05A, Installation Support
- UFC 3-301-05A, Design: Seismic Evaluation and Rehabilitation for Buildings
- UFC 3-310-03A, Design: Seismic Design for Buildings
- UFC 3-520-01, Interior Electrical Systems
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings
- UFC 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points
- UFC 4-171-05, Design: Guide for Army Reserve Facilities
- NG Pam 415-12, Army National Guard Facilities Allowances
• Americans with Disabilities Act Accessibility Guidelines (ADAAG)

• Uniform Federal Accessibility Standards (UFAS)

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


• TM 5-807-10, Signage

• TM 5-809-10/Navy NAVFAC P-355/Air Force AFM 88-3, Chap 13, Seismic Design for Buildings

• TM 5-809-10-2/Navy NAVFAC P-355.2/Air Force AFM 88-3, Chap 13, Sec B, Seismic Design Guidelines for Upgrading Existing Buildings

• Standards of Seismic Safety for Existing Federally Owned and Leased Buildings

• Army Barracks Master Plan, Appendix I, Army Barracks Standards

• Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003

• Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing

• Army Lodging Standards


• Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHNC 1110-1-23 Manual

• Army Chapel Standard Definitive Design


• Army Standards for Company Operations Facilities (COFs)

• Army Standards for Child Development Center Construction (for school-age children) October 2004

• Army Standards for General Instruction Building (GIB) and Army Continuing Education System (ACES) Standards
• General Instruction Building (GIB) and Army Continuing Education System (ACES) Standard Design Criteria

• The Army Standard for Army Lodging

• The Army Standard for Access Control Points (ACPs)

• The Army Standards for Electronic Key Card Access for all Facilities

Q.1.2.2 References

• AR 190-13, The Army Physical Security Program

• AR 200-1, Environmental Protection and Enhancement

• AR 200-2, Environmental Effects of Army Actions

• AR 200-4, Cultural Resources Management

• AR 210-20, Master Planning for Army Installations

• AR 405-45, Real Property Inventory Management

• AR 405-70, Utilization of Real Property

• UFC 1-200-01, Design: General Building Requirements

• UFC 1-300-05A, Installation Support

• UFC 2-130-07, Arctic and Subarctic Construction - Buildings

• UFC 3-120-02AN, Design Guide: Interiors

• UFC 3-400-01, Design: Energy Conservation

• UFC 3-510-01-ANF, Design: Foreign Voltages and Frequencies Guide

• UFC 3-600-01, Design: Fire Protection Engineering for Facilities

• UFC 4-510-01, Design: Medical Military Facilities

• UFGS 096800, Carpet

• UFGS 099000, Paints and Coatings

• ER 1110-345-122, Engineering and Design, Interior Design

• DA Pam 200-4, Cultural Resources Management
• Department of Defense (DoD) Interior Design Resources Website

• TI 800-01, Design Criteria

• TI 811-16, Lighting Design

• TM 5-683, Electrical Interior Facilities

• TC 25-8, Training Ranges

• Army Knowledge Online

• Army Brand Theme Operations Home Page

• Army Barracks Master Plan

• Air Force Sustainable Facilities Guide

• Air Force Interior Design Guides

• Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA [FM&C]) Sales and Outlease of Army Assets - Installation Guide

• Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website

• Air Force Sustainable Facility Guide

• Engineering Knowledge On-line (EKO) Sustainable Design and Development

• U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website

• Whole Building Design Guide

• Unified Facilities Guide Specifications (UFGS), "Division 12 - Furnishings", Construction Criteria Base

• Engineering and Construction Bulletins

• Construction Criteria Base

• Assistant Secretary of the Army memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003
Q.1.3 Chapter 4, Circulation Design Standards

Q.1.3.1 Army Standards

- **AR 420-72, Transportation Infrastructure and Dams**
- **Manual For Railway Engineering**
- **UFC 3-210-02, Design: POV Site Circulation and Parking**
- **UFC 3-230-18FA, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas**
- **UFC 3-250-01FA, Design: Pavement Design for Roads, Streets, Walks and Open Storage Areas**
- **UFC 3-260-02, Design: Pavement Design for Airfields**
- **UFC 3-550-03FA, Design: Electric Power Supply and Distribution**
- **UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings**
- **UFC 4-860-01FA, Design: Railroad Design and Rehabilitation**
- **Americans with Disabilities Act Accessibility Guidelines (ADAAG)**
- **Uniform Federal Accessibility Standards (UFAS)**
- **Manual of Uniform Traffic Control Devices (MUTCD)**
- **Chicago's Bike Lane Design Manual** (Provides a comprehensive series of technical drawings and design specifications for bike lanes).

Q.1.3.2 References

- **U.S. Air Force, Landscape Design Guide, Parking Area**
- **U.S. Air Force, Landscape Design Guide, Walkways and Bikeways** (Provides a comprehensive walkways and bikeways planning guide including sections on paving materials and gradients and curvature data).
- **Illumination Engineering Society of North America (IESNA)**
- Federal Highway Administration reference document “Accessible Sidewalks and Street Crossings – an informational guide”.

Q.1.4 Chapter 5, Landscape Design Standards
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- **UFC 3-210-05FA, Design: Landscape Design and Planting Criteria**
- **UFC 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points**
- **TM 5-630, Natural Resources Land Management**
- American Standard for Nursery Stock, ANSI Z60.1
- Overseas (Host Nation Standards)

Q.1.4.2 References

- **USAF Landscape Design Guide**
- C. Brickell and D. Joyce. Pruning and Training, 1996

Q.1.5 Chapter 6, Site Elements Design Standards

Q.1.5.1 Army Standards

- **DoD 4525.8-M, DoD Official Mail Manual**
- **AR 420-49, Utility Services**
- **AR 420-70, Buildings and Structures**
- **AR 420-72, Transportation Infrastructure and Dams**
- **UFC 4-010-01, Design: DoD Minimum Antiterrorism Standards for Buildings**
- **Americans with Disabilities Act Accessibility Guidelines (ADAAG)**
- **Uniform Federal Accessibility Standards (UFAS)**
- **TM 5-807-10, Signage**
- **Manual of Uniform Traffic Control Devices (MUTCD)**
- **MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings**

Q.1.5.2 References

- **AR 1-33, Memorial Programs**


- **AR 840-1**, *Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques*

- **UFC 3-210-04**, *Design: Children's Outdoor Play Areas*

- **TI 811-16**, *Lighting Design*

- **TM 5-663**, *Child Development Center, Play Area Inspection and Maintenance Program*

- **National Fire Protection Association (NFPA) 291**, *Recommended Practice for Fire Flow Testing and Marking of Hydrants*

- **Advisory Circular AC 70/7460-1K**, *Obstruction Marking and Lighting.*

- **UFGS, Division 12 – FURNISHINGS, UFGS 129300, Site Furnishings**


Q.1.6 Chapter 7, Force Protection Design Standards

Q.1.6.1 Army Standards

- **UFC 4-010-01**, *Design: DoD Minimum Antiterrorism Standards for Buildings*

- **UFC 4-010-02**, *Design (FOUO): DoD Minimum Standoff Distances.* (This document is a "For Official Use Only [FOUO]" publication. For web site access refer to paragraph 7.2.2.2 above.

- **Uniform Federal Accessibility Standards (UFAS)**

- **Americans with Disabilities Act Accessibility Guideline (ADAAG)**

- **DoD Instruction 2000.16, DoD Antiterrorism Standards**

Q.1.6.2 References

- **DoD Handbook 2000.12-H**, *Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence*, February 1993 (This Handbook is a "For Official Use Only [FOUO]" publication. Users may contact the Point of Contact posted at the following website to obtain a copy of the Handbook).
  
  http://www.dtic.mil/whs/directives/corres/html/o200012h.htm

- **Army Regulation (AR) 525-13**, The Army Force Protection Program (Available only through the [Army Knowledge Online](http://www.armyknowledgeonline.com) web portal).
- UFC Security Engineering series are, UFC 4-020-01FA, UFC 4-020-02FA, UFC 4-020-03FA, and UFC 4-020-04FA. The four volumes cover; Project Development, Concept Design, Final Design, and Electronic Security Systems respectively. UFC 4-020-04FA is available via the internet. Access to the other UFC’s can be gained through the U. S. Army Corps of Engineers’ Protective Design Center (PDC) web-based library. A user name and password are required. Site entry is restricted to U.S. Government agencies and their U.S. contractors. Also, a copy of the manuals can be acquired via a standard publications account.

Q.1.7 Appendix D, Sustainable Design

Q.1.7.1 Army Standard

- The SPiRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18 2003). For all other FY06 and future-year MILCON projects the minimum SPiRiT rating requirement is "Gold". See Assistant Secretary of the Army memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.

Q.1.7.2 References

- Assistant Chief of Staff for Installation Management memorandum Subject: Sustainable Project Rating Tool, dated 21 December 2002
- Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website
- U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website
- Air Force Sustainable Facilities Guide
- Whole Building Design Guide

Q.1.8 Appendix M, Historic Preservation Guidelines

Q.1.8.1 Army Standards

- Army Regulation (AR) 200-4, Cultural Resources Management
- Department of the Army Pamphlet (DA PAM) 200-4, Cultural Resources Management
- The Secretary of the Interior’s Standards for the Treatment of Historic Properties

Q.1.8.2 References
• Advisory Council on Historic Preservation
• United States Army Environmental Center
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Washington, DC 20310-0600

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03 May 2004