



FORT BELVOIR, VIRGINIA



REAL PROPERTY MASTER PLAN INSTALLATION PLANNING STANDARDS

March 2014

DRAFT
ATKINS

Note: In accordance with DoD Installation Master Planning Unified Facilities Criteria (UFC 2-100-01) issued 15 May 2012, Installation Planning Standards replaced the Installation Design Guides (IDGs).

REAL PROPERTY MASTER PLAN
INSTALLATION PLANNING STANDARDS

FORT BELVOIR, VIRGINIA

March 2014

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Installation Management Command

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Acronyms and Abbreviations

AAFES	Army and Air Force Exchange Service	ED	Extended Detention
AAP	Army Alternate Procedures	EIFS	Exterior Insulation and Finish Systems
ACHP	Advisory Council on Historic Preservation	EIS	Environmental Impact Statement
ACP	Access Control Point	EISA	Energy Independence and Security Act (of 2007)
ACSIM	Assistant Chief of Staff for Installation Management	EMS	Energy Monitoring System
ADA	Americans with Disabilities Act	ENRD	Environmental and Natural Resources Division
ADAAG	Americans with Disabilities Act Accessibility Guidelines	EPA	Environmental Protection Agency
ADFE	Aerospace Data Facility East	EPP	Environmental Protection Plan
AFSC	Army Facilities Standardization Committee	ESD	Environmental Site Design
AKO	Army Knowledge Online	ESPC	Energy Savings Performance Contract
AR	Army Regulation	ETB	Engineering Technology Building
ASCE	American Society of Civil Engineers	FBCH	Fort Belvoir Community Hospital
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers	FBNA	Fort Belvoir North Area
AT/FP	Anti-Terrorism/Force Protection	FBRC	Fort Belvoir Residential Communities LLC
BIM	Building Information Map	FEMA	Federal Emergency Management Agency
BMP	Best Management Practices	FEMP	Federal Energy Management Program
CAA	Center for Army Analysis	FMP	Forest Management Plan
Catex	Categorical Exclusion	GFCI	Ground Fault Circuit Interrupter
CATT	Combined Arms Tactical Trainer	GIS	Geographic Information System
CCSD	Conventional Construction Standoff Distance	HEC	Humphreys Engineer Center
CDC	Child Development Center	HQDA	Headquarters, Department of the Army
CFR	Code of Federal Regulations	HVAC	heating, ventilation, and air conditioning
CONUS	Continental United States	IBC	International Building Code
COS	Center of Standardization	ICRMP	Integrated Cultural Resources Management Plan
CRMP	Cultural Resources Management Plan	ICSSC	Interagency Committee on Seismic Safety in Construction
CWA	Clean Water Act	IMP	Integrated Management Practices
DA	Department of the Army	IPS	Installation Planning Standards
DAAF	Davison Army Airfield	IDS	Installation Design Standards
DBH	diameter at breast height	IES	Illumination Engineering Society
DCR	(Virginia) Department of Conservation and Recreation	IMCOM	Installation Management Command
DEQ	Virginia Department of Environmental Quality	IMP	Integrated Management Practices
DES	Directorate of Emergency Services	INSCOM	U.S. Army Intelligence and Security Command
DFMWR	Directorate of Family, Morale, Welfare and Recreation	ISA	International Society of Arboriculture
DLA	Defense Logistics Agency	ISO	Installation Safety Office
DoD	Department of Defense	LCCA	Life-cycle cost analysis
DOL	Directorate of Logistics	LDL	Land Disturbance Letter
DPTMS	Directorate of Plans, Training, Mobilization and Security	LEED	Leadership in Energy and Environmental Design
DPW	Directorate of Public Works	LEED-ND	Leadership in Energy and Environmental Design - New Construction
DrChecks	Design Review and Checking System	LID	Low Impact Development
DW	Dry wall	MACOM	Major Army Command
E&S	Erosion and Sediment	MCA	Military Construction Army
EA	Environmental Assessment	MHPI	Military Housing Privatization Initiative
ECF	Entry Control Facility	MILCON	Military Construction
		MOP PA	Maintenance, Operations, and Planning Programmatic Agreement
		MS4	Municipal Separate Storm Sewer System

Acronyms and Abbreviations (Continued)

MTMC	Military Traffic Management Command	TND	Traditional Neighborhood Design
MUTCD	Manual of Uniform Traffic Control Devices	TOE	Table of Organization and Equipment
NAF	Non-appropriated Funding	TP	Total Phosphorus
NCE	NGA Campus East	UESC	Utility Energy Service Contract
NCPC	National Capital Planning Commission	UFAS	Uniform Federal Accessibility Standards
NCR	National Capital Region	UFC	Unified Facilities Criteria
NEC	Network Enterprise Center	UPH	Unaccompanied Personnel Housing
NEHRP	National Earthquake Hazards Reduction Program	USACE	U.S. Army Corps of Engineers
NEPA	National Environmental Policy Act	USALSA	U.S. Army Legal Services Agency
NFPA	National Fire Protection Association	USGBC	U.S. Green Building Council
NGA	National Geospatial-Intelligence Agency	UXO	Unexploded Ordnance
NHPA	National Historic Preservation Act	VESCL	Virginia Erosion and Sediment Control Law
NICoE	National Intrepid Center of Excellence	VESCR	Virginia Erosion and Sediment Control Regulation
NISTIR	National Institute of Standards and Technology Interagency Report	VOC	volatile organic compound
NPS	Non-point Source Pollution	VOIP	Voice over Internet Protocol
NMUSA	National Museum of the U.S. Army	VSMP	Virginia Stormwater Management Program
NRMC	Northern Regional Medical Command	WBDG	Whole Building Design Guide
O&M	operations and maintenance		
OCAR	Office of the Chief, Army Reserve		
OSHA	Occupational Safety and Health Administration		
PAL	Privatized Army Lodging		
PEO	Program Executive Office		
PFM	Public Facilities Manual		
PR	Pollutant Removal		
RBL	Required Build-to-Line		
RCI	Residential Communities Initiative		
REC	Record of Environmental Consideration		
RFP	Request for Proposal		
RMA	Resource Management Area		
RP	Recommended Practice		
RPA	Resource Protection Area		
RPPB	Real Property Planning Board		
RR	Runoff Reduction		
RSL	Required Setback Line		
SDS	Spatial Data Standard		
SHPO	Virginia State Historic Preservation Office		
SOP	Standard Operating Procedure		
SPiRiT	(LEED) Sustainable Projects Rating Tool		
SRM	Sustainment, Restoration, and Maintenance		
SWM	Stormwater management		
SWPPP	Stormwater Pollution Prevention Plan		
TDA	Table of Distribution and Allowances		
TI	Technical Instruction		
TM	Technical Manual		
TMDL	Total Maximum Daily Load		
TN	Total Nitrogen		

Introduction

1



The compilation of photos above reflects the ideal state that Fort Belvoir desires to achieve with the integration of the Installation Planning Standards.

Overview

Purpose and Scope

The Installation Planning Standards (IPS) is one of several real property planning documents that work together to direct future growth at the Post. Each document focuses on a separate aspect of planning, and the IPS promotes visual order and architectural consistency that meets DoD sustainability and energy efficiency requirements for Fort Belvoir. It does this by standardizing design guidance in order to maintain and improve the quality of the total environment at the Installation. The IPS is organized as follows:

- **Site Planning Standards:** determines the appropriate manner in which to develop available land parcels by employing regulating guidelines that manage future growth to maximize the utilization of available land.
- **Building Design Standards:** establishes the parameters for architecture that regulate style, form, mass, height, use, materials, and colors. The result is a consistent set of guidelines that ensure buildings relate to each other and contribute to a unified visual character that is becoming to the Post.
- **Circulation Design Standards:** regulates the networks for pedestrians, bicycles, and vehicles, by establishing road/path sections that define number and width of lanes; street planting; width and placement of sidewalks and bicycle lanes; and medians. The goal is to design safe and efficient routes with a consistent aesthetic appearance.
- **Landscape Design Standards:** establishes guidelines for the most common landscape circumstances such as: foundation planting; open spaces; buffers/screening; and plant selection. Guidelines will ensure a consistent approach to planting design. Landscape must also meet security standards for placement and height to avoid opportunities for concealment.
- **Site Elements Design Standards:** determines the appropriate styles of outdoor furnishings and other exterior features to ensure that all areas of the Installation have appropriate amenities with a consistent palette of style, material, and color.



Audience and Use

The IPS is used by many participants and organizations that fall into one of two groups.

- **Regulatory Group:** those individuals and organizations who author and establish the regulatory requirements. They include the Garrison Command Staff, Garrison planning staff, Installation Management Command (IMCOM), and sometimes off-Post regulating agencies that contribute to the planning oversight at the Installation.
- **Implementing Group:** those individuals or organizations that are putting some action into effect that will need to adhere to the guidelines of the Installation. They include Installation mission partners, the U.S. Army Corps of Engineers (USACE), consulting contractors, architectural and engineering firms completing designs on Post, and other support agencies that are present on the Installation.

The regulating group provides the requirements that drive the IPS to reflect the desired results of future development. The output is provided to the implementing group that transposes that information into physical form. The implementation group also provides feedback to the regulators concerning issues not covered in the IPS or during normal review processes. Not all design aspects that influence a project can or shall be covered in this document, so the feedback process is an important vehicle of communication to achieve the desired future state for all those involved.

Referencing the IPS shall occur whenever maintaining, renovating, and/or designing real property as it pertains to aspects of site planning, architecture, circulation, landscape, and site elements to ensure compliance. Regardless of the funding source, projects that will have an impact on the visual character of the Installation shall adhere to the standards in this document. The process by which the regulating and implementing groups use this document is outlined below and described in more detail in Appendix B.

New facility construction, additions, and renovations on Fort Belvoir follow the General Standard Operating Procedure (SOP) for Construction Project Development and Execution (see Appendix A for details). **This requires that the Implementing Group follow a step-by-step process from the initial planning and programming stage of a project to the post-construction phase.** They coordinate with the Regulatory Group during the process to ensure all applicable regulations, design criteria, and codes are completed; the design is formally reviewed and approved by all consulting parties; construction phase forms and inspections are done; and post construction checklists are completed and authorized. Communication between the two groups is key to completing a successful project.

Fort Belvoir generally follows state and local development standards where possible. For additional guidance, refer to Fairfax County's Public Facilities Manual for consulting contractors and agencies. Designs completed for the DPW shall meet the stricter standard presented by either the manual or this IPS.

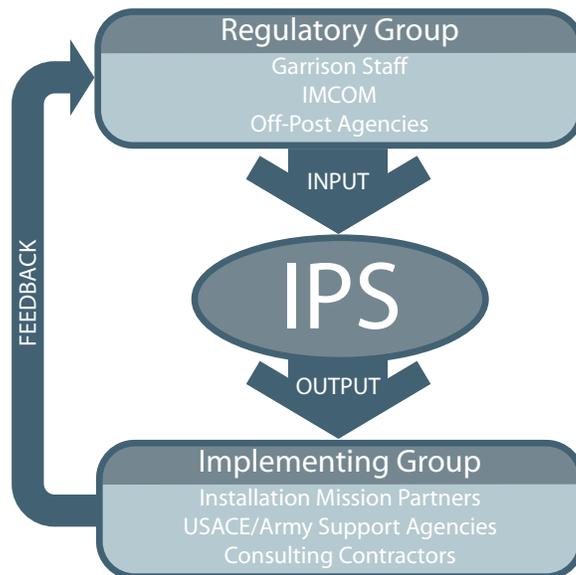


Figure 1.1: Design Guide Audience and Use

Using the IPS

Document Structure

Beyond the introductory chapter, which discusses the process, use, and implementation, the IPS is divided into two other sections which include the guideline chapters and the appendices.

Most of the pertinent design information is contained in the guideline chapters. It is here that specific design criteria are given for various real property assets pertaining to the primary topics of:

- **Site Planning:** divides the Installation into Districts, each of which has common development characteristics, that is described in terms of what currently exists and what it shall become in the future. It establishes regulating guidelines for building and parking placement and orientation; and reserves areas for open space.
- **Architecture:** describes various building prototypes and the design criteria for each. Design criteria include architectural styles, exterior materials/colors, building height and massing, permitted uses, roof profiles, and fenestrations.
- **Circulation:** defines the various types of roads and paths that occur on the Installation, and provides regulating guidance on design details such as number of lanes, widths, and medians.
- **Landscape:** identifies the most common landscape situations, and provides guidance on appropriate planting design strategies, plant selection, installation, and maintenance.
- **Site elements:** illustrate the appropriate types and styles of outdoor amenities such as furniture, lighting fixtures, shelters, recreational equipment, and signage.

The last section is the Appendices which contains supplemental information that helps to support the guidelines. Each appendix has specific types of information as follows:

- **Appendix A:** provides checklists for implementing the IPS and project requirements.
- **Appendix B:** outlines the Technical Design Guide including the benefits and implementation practices of Installation-wide principles.
- **Appendix C:** includes the Army Standards and References for each chapter and applicable regulations.



Figure 1.2: IPS Process Diagram

Enforcing and Maintaining the IPS

The design, maintenance, and renovation processes that involve real property undergo countless decisions to arrive at the end result. In comparison, this document has a narrow breadth of regulating requirements and will not address all the issues that arise. Therefore, open dialogue is important between those who oversee these standards and those who work to properly implement them.

It is the responsibility of the Facility Planning Division of the Directorate of Public Works (DPW) to disseminate and administer the standards within the IPS to all those involved with work that impacts the visual appearance of the Post. During any project, issues that are not addressed in this document must be reviewed and agreed upon by all parties to arrive at an acceptable solution.

Much of the feedback that the DPW receives may dictate revisions and additions to the IPS. Therefore, one shall consider this a “living document” that shall be periodically updated to ensure its continued relevance and usefulness. Changes to the IPS are proposed by the DPW and presented to the Director of DPW, Garrison Commander, or members of the Real Property Planning Board (RPPB or the “Board”) for approval. Once changes have been approved, those changes will be annotated in the IPS as such.

Review and Approval Process

Planning, design review, and execution requirements on Fort Belvoir vary based on project scope and size. Routine operations and maintenance actions receive the lowest level of review. Activities that require excavation or exterior actions require a DPW-approved permit. New facility construction, additions, and renovations receive a higher degree of review. Scope and funding source will determine the exact review and approval procedures. Appendix A: Fort Belvoir General Standard Operating Procedure for Construction Project Development and Execution provides a general summary and approval process for proposed projects.

Design agencies shall send design submittals to the proper directorates for each project for review and approval. These include the Directorate of Public Works (DPW), Directorate of Emergency Services (DES), Directorate of Family, Morale, Welfare and Recreation (DFMWR), Directorate of Plans, Training, Mobilization and Security (DPTMS), Installation Safety Office (ISO), Privatized Utilities, and Fort Belvoir Network Enterprise Center (NEC). Final approval of projects is by the Director of DPW, Garrison Commander and/or RPPB.

Compliance

For the IPS to work optimally as a design tool, it is essential that the Master Planner or designated representative establish an understanding of the IPS among mission partners and future building proponents.

This can be best established at the RPPB level, where all Installation principals are represented. The DPW staff Master Planner and Installation Maintenance Contractor representative shall ensure that guidelines and requirements of the IPS are readily available to and understood by all parties involved in the design of new facilities, additions or alterations to existing facilities, or maintenance.

The Master Planner or designee, acting in support of the RPPB, is the first level reviewer of projects (Sustainment, Restoration, and Maintenance [SRM]; Military Construction, Army [MCA]; and Non-appropriated Funding [NAF] to include Design Build) and other requests for actions that involve compliance with the IPS. The Garrison Commander, supported and advised by the RPPB, is the final authority in enforcement of the IPS. Should issues arrive that are above the Garrison Commander level, IMCOM shall review the request and recommend resolutions.

Project Requirements

It is recommended that the Projects Requirements IPS Checklist (Appendix A) be used as a pre-design planning tool for initiating projects and presenting a functional project description at MILCON Planning and other major project level (i.e., National Guard, Army Reserve, Army Air Force Exchange Services, Defense Commissary Agency) design charrettes. This checklist can assist charrette participants with both project formulation and documentation, and be used to validate results and set project expectations. By the very nature of the planning process, it is unlikely that the checklist data will be complete prior to the charrette event; however, it shall be completed to the greatest extent possible.

The requirement to use the IPS as a design tool in all facility planning, design, and construction shall be included in the Request for Proposals on new projects, Scopes of Work for new projects, and maintenance agreements.

Project Approval

Project requests to include a DA Form 4283 shall be submitted to the DPW or equivalent, and will include the required Design Team IPS Checklist and supporting documentation discussed here.

The Design Team IPS Checklist (Appendix A) is to be completed by the design team to ensure that guidelines and standards have been considered in the design process. 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. The accepted checklist shall become a part of the project record files.

National Capital Planning Commission

The National Capital Planning Act enables the National Capital Planning Commission (NCPC) to be the central planning agency for the federal government in the National Capital Region. NCPC is empowered with review authority over all federal development projects to ensure orderly and coordinated development of the federal government in the region and consistency with the Comprehensive Plan for the National Capital. Therefore, the development strategies contained in the NSF Carderock Master Plan are intended to meet NCPC requirements as well as be consistent with the policies of the Comprehensive Plan for the National Capital. These policies include:

- Consulting with local agencies to ensure that federal workplaces enhance the design qualities and vitality of their communities
- Planning federal workplaces to be compatible with the character of the surrounding properties and community and, where feasible, to advance local planning objectives such as neighborhood revitalization.

While the review process remains the same regardless of where a project is located, NCPC has approval authority over all federal projects located in the District of Columbia (40 U.S.C. 8722(b)(1) and (d)), and advisory authority for projects located in the environs (40 U.S.C. 8722(b)(1)).

Site Planning Standards

2

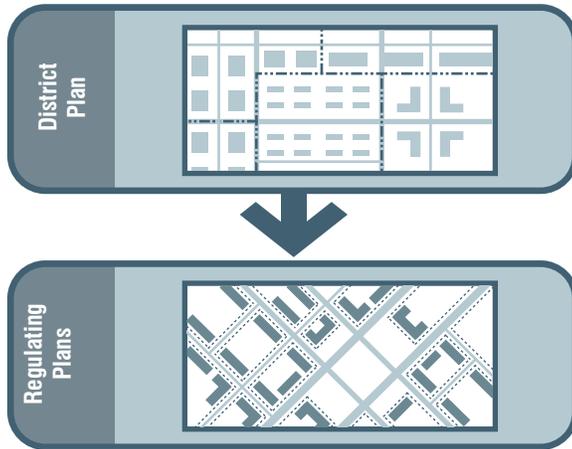


Figure 2.1: Site Planning Standards Process

Introduction

This chapter provides planning guidance of major program elements including:

- Roads: proposes location of new road alignments and enhancement/preservation of existing roads.
- Buildings: regulates placement, orientation, massing and height.
- Open Space: indicates the bounds for environmental preservation, stormwater/utility infrastructure, and/or public gathering areas.
- Parking: determines the extent of land in which parking may occur.
- Vehicle Entries: directs general location where traffic should enter an area.
- Corridors: indicates general placement of connections needed for infrastructure, circulation, and/or natural habitat.

The first step in providing planning guidance is by dividing the Post into smaller areas known as Districts. Districts encompass areas sharing similar physical characteristics and/or development patterns. The resulting district boundaries are usually following roads, overlaid on edges of land uses, or demarcating physiographic features. With the districts established, regulating guidance is given that supports the master plan's vision for intelligent and controlled growth. The regulating plans govern horizontal and vertical development patterns that will achieve the planning standards that can achieve the type of growth that the master plan is anticipating for the long-term viability of the Installation.

District Plan

Fort Belvoir is divided into 20 districts (see Figure 2.2). Of these districts, only 11 have regulating guidelines because they have been identified by the master plan as areas where future growth may occur. Districts having no regulating guidance are not included in this document because other design directives exist, or significant development is not expected to occur.

Regulating plans provide design instruction for major aspects of development that may occur within a district: namely road alignments; building placement and size; open space preservation; parking area allocation; and circulation entrances. Only the most prominent aspects of site planning





Davison Army Airfield



Fort Belvoir Golf Course



Defense Logistics Agency



Illustrative concept of the Commissary

are regulated, such as: build-to lines, minimum and maximum building heights, building entry orientations, open space areas/corridors, functional uses, parking extents, and roadway alignments.

District Descriptions: Existing Conditions

1 Davison Army Airfield (DAAF) District

This district is a self-operated campus organized around a single function of aviation operations and missions. Development is low-density industrial in nature focused around the runway. Large hangars front the taxiway and aprons, while smaller administration and warehouse facilities are oriented toward the perimeter road. A draft ADP was completed for this area and is reflected in the regulating plans later in this chapter.

2 Golf Course/National Museum of the U.S. Army (NMUSA) District

This district is divided into two distinct areas. First is the Fort Belvoir Golf Course comprising two 18-hole courses with clubhouse and public amenities. Second is the NMUSA site that is a near-term project that includes museum, parking, gardens, and outdoor exhibition space. The setting is rural with rolling topography that allows for distant views. Access is either internally from Beulah Road on Post, or from the Fairfax County Parkway off Post.

3 Intelligence District

4 Defense Logistics Agency/Intelligence and Security Command (DLA INSCOM) District

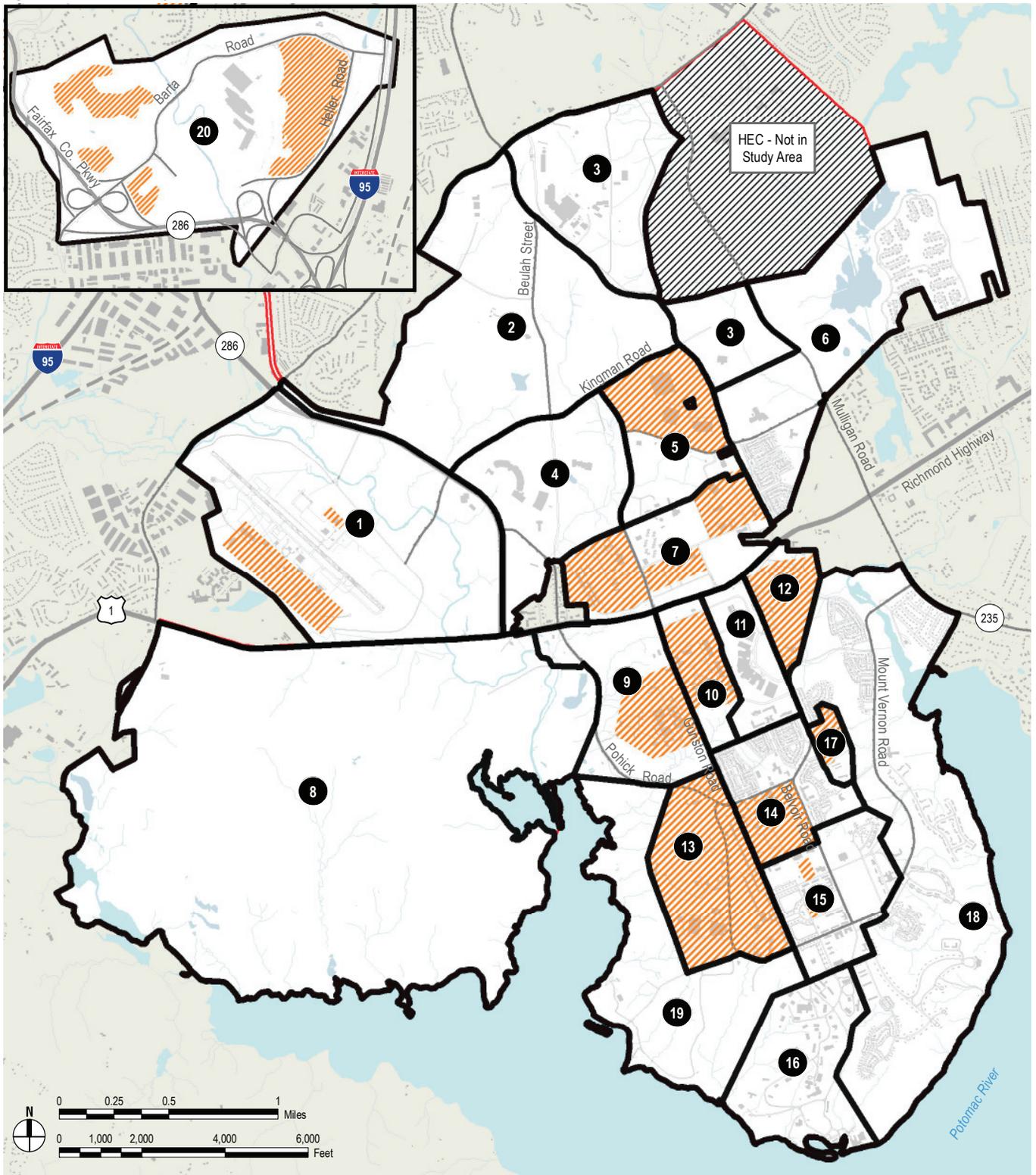
20 Fort Belvoir North Area (FBNA) District

These three districts are typified by suburban office campus design, that is occupied by a single mission partner with hundreds or thousands of employees. There is usually a single large office building centrally situated on the site, and surrounded by park-like open space and parking. Each campus is isolated from its surroundings physically by its own perimeter security. Aesthetically, the architecture and site design has individual iconic character that reflects a specific mission.

5 North Post Community Support District

This district is planned for considerable redevelopment into a regional hub of retail, office, residential, educational, and recreational uses. The first phase is underway with the construction of the newly designed Post Exchange (PX) and Commissary. Following phases will include a restaurant, townhomes, administrative offices, retail/community service shops, and recreation facilities. These facilities are centered around a pedestrian promenade with a dense cluster of public services to provide a walkable environment.

Figure 2.2: Districts Map



- | | | | |
|--------------------------------|-------------------------------------|--------------------------------|---|
| District Boundaries | Regulating Plan Areas | | |
| 1 DAAF District | 5 NP Community Support | 9 1400 West District | 13 Industrial Area District |
| 2 Golf Course/NMUSA | 6 North Residential District | 10 1400 East District | 14 Town Center District |
| 3 Intelligence District | 7 Lower North Post District | 11 Medical District | 15 Historic Core District |
| 4 DLA INSCOM District | 8 Southwest District | 12 SP Community Support | 16 300 Area District |
| | | | 17 Admin Campus District |
| | | | 18 Community Activities District |
| | | | 19 Recreation District |
| | | | 20 FBNA District |



Office of the Chief Army Reserve in Lower North Post District



U.S. Army Legal Services Agency in 1400 Area East District



Warrior Transition Complex in the Medical District

6 North Residential District

18 Community Activities District

These two districts are comprised of residential villages typified by traditional neighborhood design (TND) standards. Each village features common open spaces, pedestrian paths, public facilities, recreation areas, and a consistent architectural theme. These districts are managed under the Residential Communities Initiative (RCI). Portions of this district contain properties that are eligible for National Register which have additional regulations for historic preservation, under which RCI will need to observe.

7 Lower North Post District

This district encompasses a mix of uses including administrative offices, reserve centers, troop barracks, motor pools, warehouses, and recreational facilities. These large facilities are spread across the district in low density, office park style development. The existing grid of roads establishes rectilinear development parcels, and buildings that are orthogonally oriented. There are sites that are vacant and can be readied for development.

8 Southwest District

This district is left mostly in its natural state. It encompasses most of the wildlife refuges on Post as well as operational ranges used for engineer/troop training. Development in this district is minimal due to environmental constraints and the lack of amenable infrastructure.

9 1400 Area West District

Administrative office buildings, storage warehouses, and storage lots comprise this district. Development has a grid configuration of streets, and buildings are orthogonally arranged on rectilinear parcels. The density is low and distributed fairly evenly across the district. The existing infrastructure and facilities are aging, and many are vacant, which makes this a prime location for redevelopment.

10 1400 Area East District

This district functions as an administrative center, comprised of single and multi-mission partner office buildings. The development pattern is low- to mid-density organized in a grid of streets and rectilinear building parcels. Recent development favors higher density with taller buildings and multi-level parking. This will typify the type of compact development planned for this district.

11 Medical District

Recent construction in the last five years has transformed the Medical District into a regional hub, servicing the National Capital Region for military medical care. This district encompasses the Fort Belvoir Community Hospital (FBCH), Northern Regional Medical Command (NRMC), dental clinic, the Warrior Transition Complex, USO Warrior and Family Center, and the National Intrepid Center of Excellence (NICoE). The development has kept with the orthogonal grid that typifies the South Post.

12 South Post Community Support District

Development within this district is low-density suburban in character. Buildings are one- to two-stories in height with surface parking lots at the front, and open space and wooded areas to the rear. Functions include a child development center (CDC), Fisher Houses, community center, recreational fields, and future Privatized Army Lodging (PAL) facility.

13 Industrial Area District

This district consists of one- and two-story warehouses/ administrative buildings, outdoor storage lots, motor pools lots, and service yards. Most facilities are in disrepair or obsolete. Redevelopment would provide modern and efficient facilities that better utilize the limited land area and allow better functionality.

14 Town Center District

This district has a mixture of uses including administrative offices, civic buildings, retail shops, recreation facilities, and residential villages. Most of this district has been redeveloped into a vibrant community and residential area. Further redevelopment can continue to evolve this area into a local and regional community hub. Portions of this district may be eligible for the National Register which applies additional regulations on facilities for historic preservation.

15 Historic Core District

This district is the oldest developed area on Post. The formal planning that created a street grid and Colonial Revival-styled buildings has set the precedent for the visual character of Fort Belvoir. Portions of this district contain properties that are eligible for the National Register which have additional regulations for historic preservation.

16 300 Area District

The 300 Area District is a heterogeneous district, as it encompasses the most diverse group of mission partners within a self-contained perimeter. This plethora of facilities with various missions that were established over time resulted in an inconsistent planning pattern on the land. This dissonant plan is emphasized by the informal siting arrangement of roads and buildings, which are loosely based on the topographic conditions, and the use of inconsistent building materials and colors.

17 Administrative Campus District

Today, this district encompasses the DeWitt Army Hospital, Army lodging facilities, and surface parking lots. Due to the construction of the FBCH, the DeWitt Army Hospital is slated for demolition, with the existing lodging to be removed as well. This will clear the site for high-density development of administrative and community facilities.

19 Recreation District

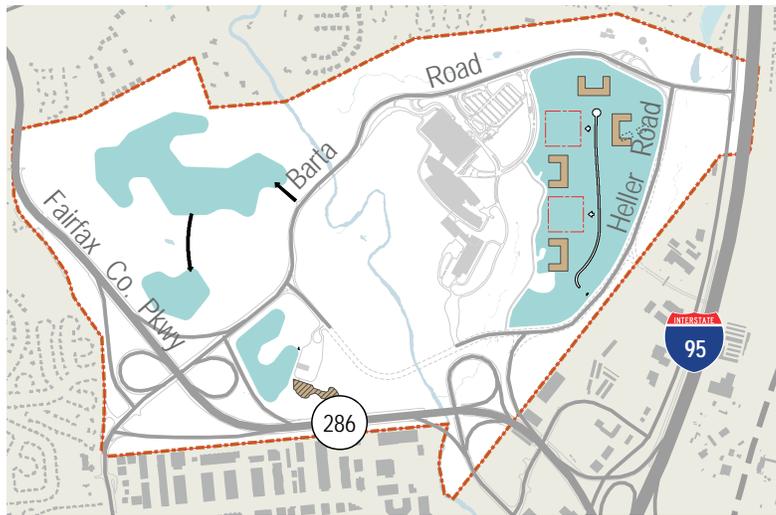
The Recreation District is comprised mostly of the Tompkins Basin Recreation Area, that has a wide range of recreational facilities such as picnic pavilions, outdoor sports courts, dog park, fishing pier, non-motorized boat launch, archery range, trails and family travel camp. This district is mostly in a natural state of woodlands and open fields.



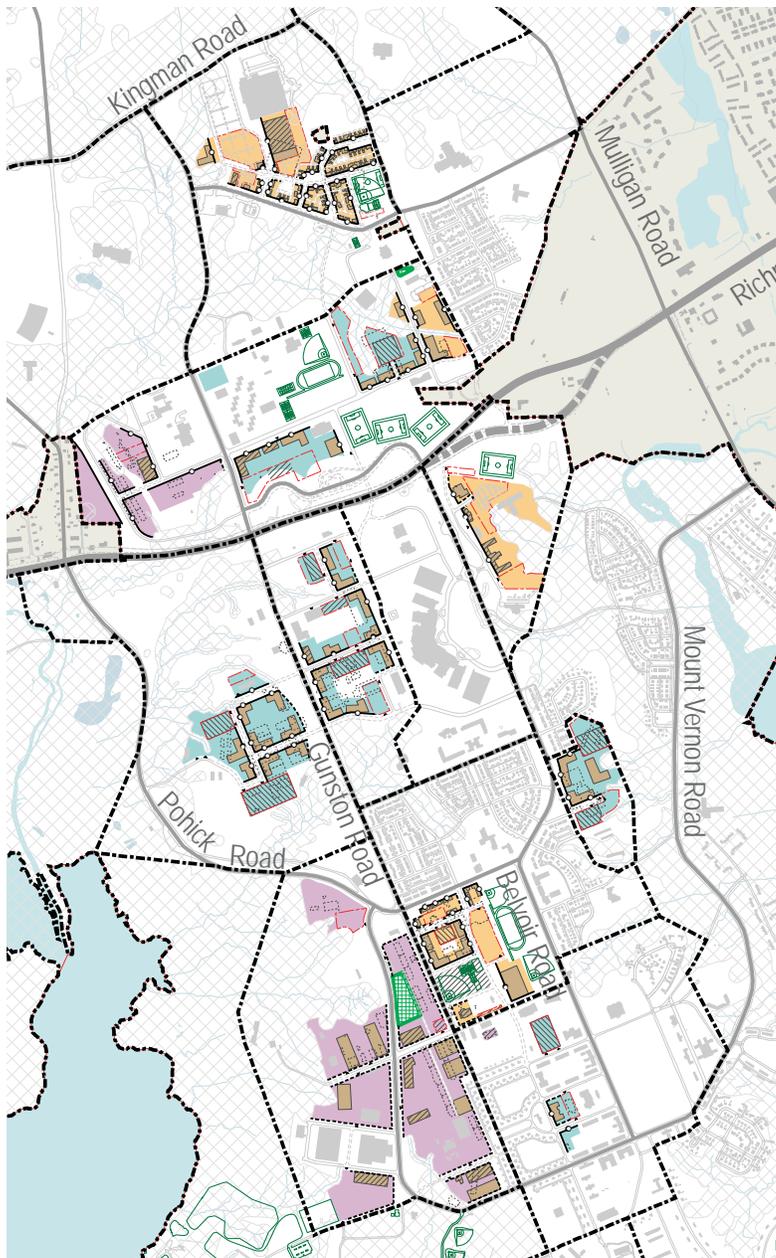
12th Street mixed-use development in the Town Center District



300 Area District



Regulating plans for FBNA (above) and North and South Posts (below)



Regulating Plans

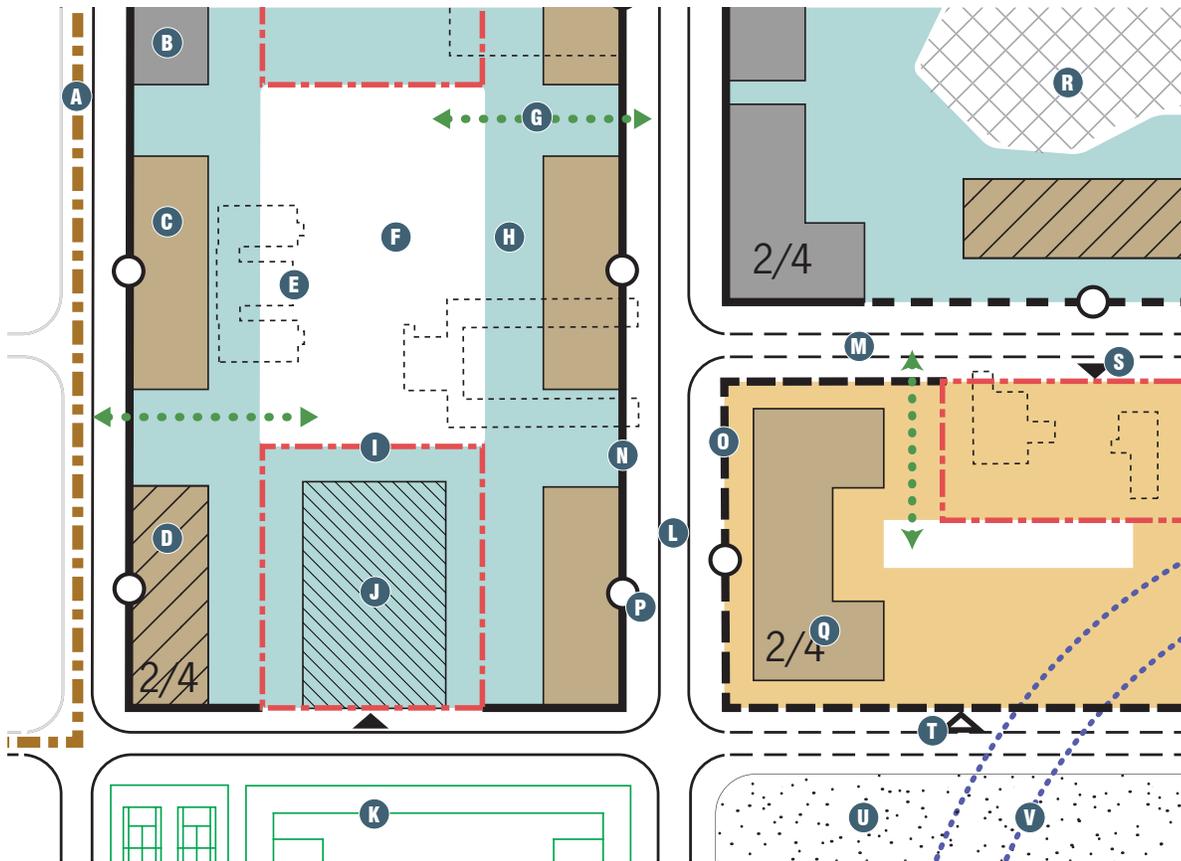
The following section presents design guidance for the 11 districts that are being regulated. Each district has the following information presented:

- **Introduction:** provides a brief description of the bounds where regulating guidance is being given within the district. It also provides some narrative of the future plans intended for this area.
- **Road Configuration:** describes the overall layout of the roads and their hierarchy.
- **Buildings:** describes the functional uses that may occur, and how structures are to be placed and oriented.
- **Parking:** explains where parking - whether surface or multistory structure - is to occur.
- **Open Space:** explains where open spaces are to occur and what is intended for those areas.
- **Regulating Plan:** graphic showing area being regulated, and the types of guidance that are being given.

See Figure 2.3 for a regulating plan example that shows all the components that can make up a regulating plan and a definition for each component. The purpose of the regulating plans is to provide general guidance for the logical development of land parcels. However, special circumstances may arise with individual projects that deviations from the regulations in this document. In such cases, deviations will need to be reviewed and approved by the Directorate of Public Works. While such deviations may be allowed, the general premise of the regulating guidance must be met, and that is all future projects must strive to be:

- **Walkable:** ensure that configurations and placement of facilities is easily accessible by walking and that the necessary infrastructure is in place to facilitate walking, biking, and other pedestrian-based access..
- **Compact:** realize that land is finite and must be conserved to ensure the viability of continued growth and expansion. Development must assume the smallest footprint, and must accommodate space for future adjacent development.
- **Conserved:** protective of areas designated for open space as a collective resource for all adjacent and abutting facilities. These are to be planned collectively for environmental preservation, stormwater management, and pedestrian outdoor spaces.
- **Compatible:** ensure that functions are appropriate for the development parcel in which the project is being placed, and is compatible with adjacent facilities and land uses.
- **Capable:** observe the types of development imposed for each district as mandated by the Vision and Development Plan and the Installation Planning Standards. Each project needs to balancing resources, infrastructure demands, and expansion capabilities in coordination with existing and future facilities.

Figure 2.3: Sample Regulating Plan Diagram



- A District Boundary.** Delineates the extents of a given area where regulating guidance may occur.
- B Building - Existing.** Structure that will remain in its current location and configuration.
- C Building - Proposed.** Structure that is proposed to be constructed within the time frame of this regulating plan. Exact location and configuration are notional.
- D Near Term Project.** Proposed construction that is programmed to occur within five to seven years.
- E Building - Demo.** Structures that will be demolished within the time frame of this regulating plan.
- F Open Space Parcel.** Areas other than development parcels reserved for recreation, utilities, environmental constraints, tree preservation/mitigation, pedestrian circulation, stormwater facilities, or existing conditions.
- G Open Space Corridor.** Notional corridor for pedestrian access, utilities, and/or stormwater conveyance that is free of permanent structures or other obstructions.
- H Development Parcel.** Highlighted area designating the maximum extent of buildable area. The color dictates the allowable land use or functional use.
- I Parking Zone.** Delineates the maximum extent for surface parking lots or multi-story garages. When located in open space parcels or BRAC PA Restricted Areas, parking is only for recreational uses.
- J Parking Garage.** Multi-level parking structure that is proposed within the time frame of this regulating plan.
- K MWR Recreation.** Sport fields, courts, and playgrounds
- L Existing Road.** Existing road alignments to remain.
- M Future Road.** Proposed road alignments or re-configuration of existing roads.
- N Required Build-To-Line (RBL).** A line generally parallel to the road, where the building's primary exterior wall must coincide.
- O Required Setback Line (RSL).** A line generally parallel to the road, where the building's primary exterior wall may coincide barring other setback requirements.
- P Entry Location.** Identifies the direction a building's primary facade and main entrance shall be oriented.
- Q Building Height.** Numerical designation for minimum and maximum number of occupied floors allowed.
- R Constrained Development Areas.** Areas prohibited to development due to environmental constraints.
- S Primary Vehicular Entry.** Designates the general location of primary access into a development parcel.
- T Secondary Vehicular Entry.** Designates the general location where minimal vehicles will access the development parcel.
- U BRAC PA Restricted Area.** Constrained areas where vertical development should be avoided to minimize impacts to viewsheds from adjacent historic properties.
- V Transit/Utility Corridor.** Right-of-way for future or current transit route or utilities.

Davison Army Airfield Regulating Plan

DAAF is located in the northwest quadrant of North Post and is bounded by the Installation boundary/Telegraph Road to the west, Fairfax County Parkway to the north and east, and U.S. Route 1 to the south. The regulating plan identifies development parcels that will impact most of the existing facilities and infrastructure on both sides of the runway. The long-term redevelopment strategy will site new facilities west of existing buildings, and demolish most of the original structures. This will ensure that buildings are outside runway clearance zones, thereby adhering to airfield clearance standards and improving mission functionality. The demolition of obsolete buildings will eliminate intrusions into the clearance zones and increase apron space.

Road Configuration

The road configuration for the airfield is based on a loop road that circumnavigates around the runway, providing access to all the airfield facilities. The majority of road infrastructure will be maintained in its current alignment and configuration. Most improvements will be the realignment of access drives to individual buildings and parking lots as new development occurs. Alignments will maintain a grid of streets in developed areas, where an orthogonal arrangement of circulation and development parcels will be the most efficient. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area will have a very specific mission function related to airfield operations. Buildings will typically be large with rectilinear forms, and industrial in appearance. To establish some semblance of order, building placement must be orthogonal to the street grid or runway. Setback from the roads may vary depending on the ultimate size of the building, and its ancillary program requirements. Unless otherwise shown, buildings can be located anywhere within the development parcel, subject to program requirements and approval by the Garrison. The following building prototypes are appropriate within the development parcels:

- Administrative
- Warehouse/Flex-Space
- Parking Garage/Deck

The overall architectural character will be utilitarian in appearance, with a simple architectural design character. For additional details on building prototypes and standards, see Chapter 3.

Parking

Parking is consolidated into one lot at the rear of buildings. Lots may service more than one facility, and therefore can be shared by multiple mission partners. It is anticipated that surface lots will be implemented. For additional details on parking lot design, see Chapter 4.

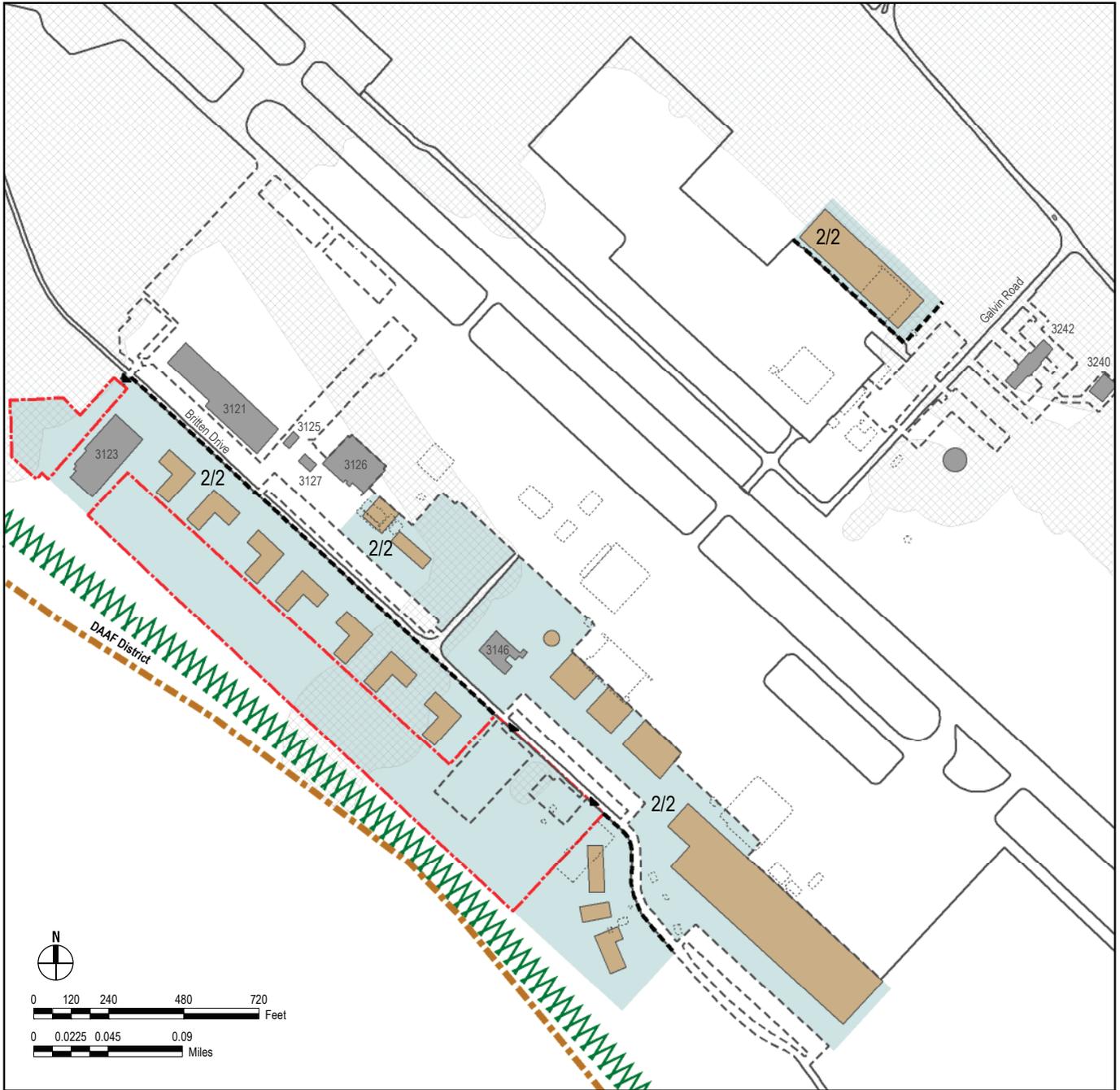
Open Space

Areas reserved for open space within this district are mainly building setbacks from the road, environmental constraints, existing development, and buffers. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems. The buffer along the western boundary will implement existing topography and vegetation to minimize conflicts with adjacent land uses.

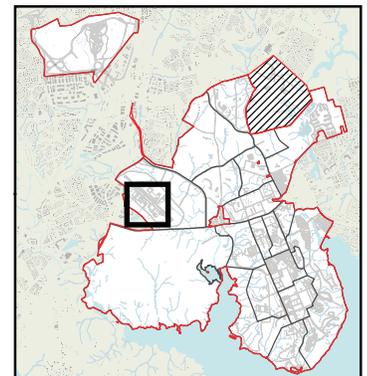


Davison Army Airfield facilities are utilitarian whose design is based on functionality for mission requirements.

Figure 2.4: Davison Army Airfield Regulating Plan



- | | |
|---------------------------------|-------------------------------|
| 2/4 Min. / Max. Building Height | Constrained Development Areas |
| Primary Vehicle Entrance | Airfield Development Parcel |
| Existing Pavement | Building - Demo |
| Future Pavement | Building - Existing |
| District Boundary | Building - Proposed |
| Required Build-To-Line | Parking Zone |
| Required Setback Line | 100' Minimum Buffer |



North Post Community Support Regulating Plan

The North Post Community Support District is located on the North Post and is bounded by Gunston Road to the west, Kingman Road to the north, Woodlawn Road to the east, and Gorgas Road to the south. This area is being completely redeveloped, with multiple uses that are focused around a small main-street corridor connecting the retail anchors of the PX/Commissary to Gorgas Road. Buildings along the retail corridor will have shops and food service on the ground floor with residential on the upper floors. To the east, the development will transition to residential housing with recreational fields at the far end near the intersection of Gorgas and Woodlawn Roads. Near-term development entails a new Commissary, Car Care Center, and a Named-brand dining restaurant to the north and west of the retail corridor.

Road Configuration

The redevelopment of this area will result in a tight grid of residential and public streets. A series of tertiary and residential roads will form relatively small blocks that mimic existing neighborhoods on Post. Landscaping, sidewalks, and site furnishings are to be installed as part of the streetscape to facilitate pedestrian movement and maintain the design aesthetics for roadways. The main-street corridor will receive the highest degree of streetscaping to emphasize its importance of the centralized public space for this area. The proposed street grid will tie into the existing road network at key intersections along Gorgas and Kingman Roads. Portions of Gorgas Road will be widened to accommodate the new intersections and tuning lanes. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of an overall development plan, and comprise a variety of functional prototypes. To maintain a consistent urban appearance, their placement must be orthogonal to the street grid, with uniform setbacks that match adjacent buildings of the same type. Similar building prototypes must share proportions in terms of height, form, and massing. The following building prototypes are appropriate within the development parcels:

- Commercial
- Mixed-use
- Civic
- Administrative
- Residential
- Parking Garage/Deck

The overall effect is one where buildings contribute to a uniform urban appearance. The largest commercial buildings may have focal features integrated into their facades to call attention to entrances and command a prominent street presence. The majority of buildings, however, are to be of similar design hierarchy, so as to

create a uniform visual appearance. For additional details on building prototypes and standards, see Chapter 3.

Parking

Retail parking is consolidated into large lots at the front of the PX, Commissary and other minor commercial establishments. Parking for employees and service lots are to be located to the rear or sides of the buildings to lessen their visual prominence. It is anticipated that paved surface lots will be implemented to accommodate all parking and service needs. For additional details on parking lot design, see Chapter 4

Open Space

Areas reserved for open space include: environmental constraint areas, recreation facilities, building setbacks, and utilities. Building setbacks and open space corridors can permit room for pedestrian streetscape, utility corridors, and innovative stormwater management systems. The existing water towers will remain in their current location at the corner of Gorgas and Woodlawn Roads. Long-term renovation and replacement of the tanks will occur as needed.



The PX serves as the anchor retail destination.



The retail corridor can resemble the existing South Post Town Center along 12th St.

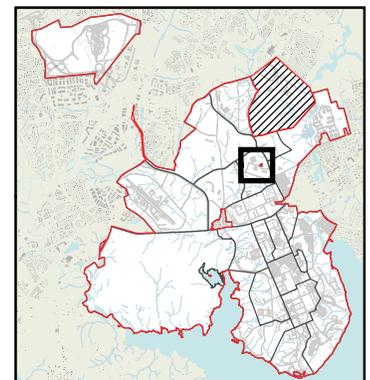


Residential development can reflect the same appearance as Lewis Village across Gorgas Road.

Figure 2.5: North Post Community Support Regulating Plan



- | | |
|---------------------------------|---------------------------------|
| 2/4 Min. / Max. Building Height | — MWR Recreation Framework |
| ○ Entry Location | ▨ Constrained Development Areas |
| — Existing Road | ■ Community Development Parcel |
| - - - Future Road | □ Building - Demo |
| — District Boundary | ■ Building - Existing |
| — Required Build-To-Line | ■ Building - Proposed |
| - - - Required Setback Line | □ Parking Zone |
| ↔ Open Space Corridor | ▨ Near Term Project |



Lower North Post Regulating Plan: West Side

The west side of the Lower North Post District is located just north of U.S. Route 1, and is bounded by Foster and Goethals Roads to the north, Gunston Road to the east, and Meade Road and the Installation boundary to the south and east. The aging World War II warehouses are obsolete, and present an opportunity for redeveloping this area with modern storage facilities and motor pool lots. Should the existing rail line be converted to transit with access to the Metrorail, this area may transition into an office complex with a transit station along Meade Road. If a dedicated transit line along U.S. Route 1 were to happen, the triangular parcel of land to the west may be part of a transit hub development. Long-term plans are to redevelop this area with new warehousing facilities and transit linkages to the rail and Route 1 corridors.

Road Configuration

The road configuration will remain the same. The only major change improvement is the possible extension of Goethals Road to connect with Meade Road. This would only occur if transit comes to this part of the Installation. If so, this road extension would be a pedestrian-only corridor with stairs or escalators to negotiate the uphill climb from the transit station. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area will have a very specific utilitarian or operational mission function; hence, the likelihood of great variation in building size, form, and mass. To establish some semblance of order, building placement must be orthogonal to the street grid, with uniform road setbacks. The following building prototypes are appropriate within the development parcels:

- Warehouse/Flex-Space
- Administrative
- Parking Garage/Deck

The overall effect is that no one building is visually prominent, and their functional purpose will likely determine a simple architectural design character. For additional details on building prototypes and standards, see Chapter 3.

Parking/Transit Center

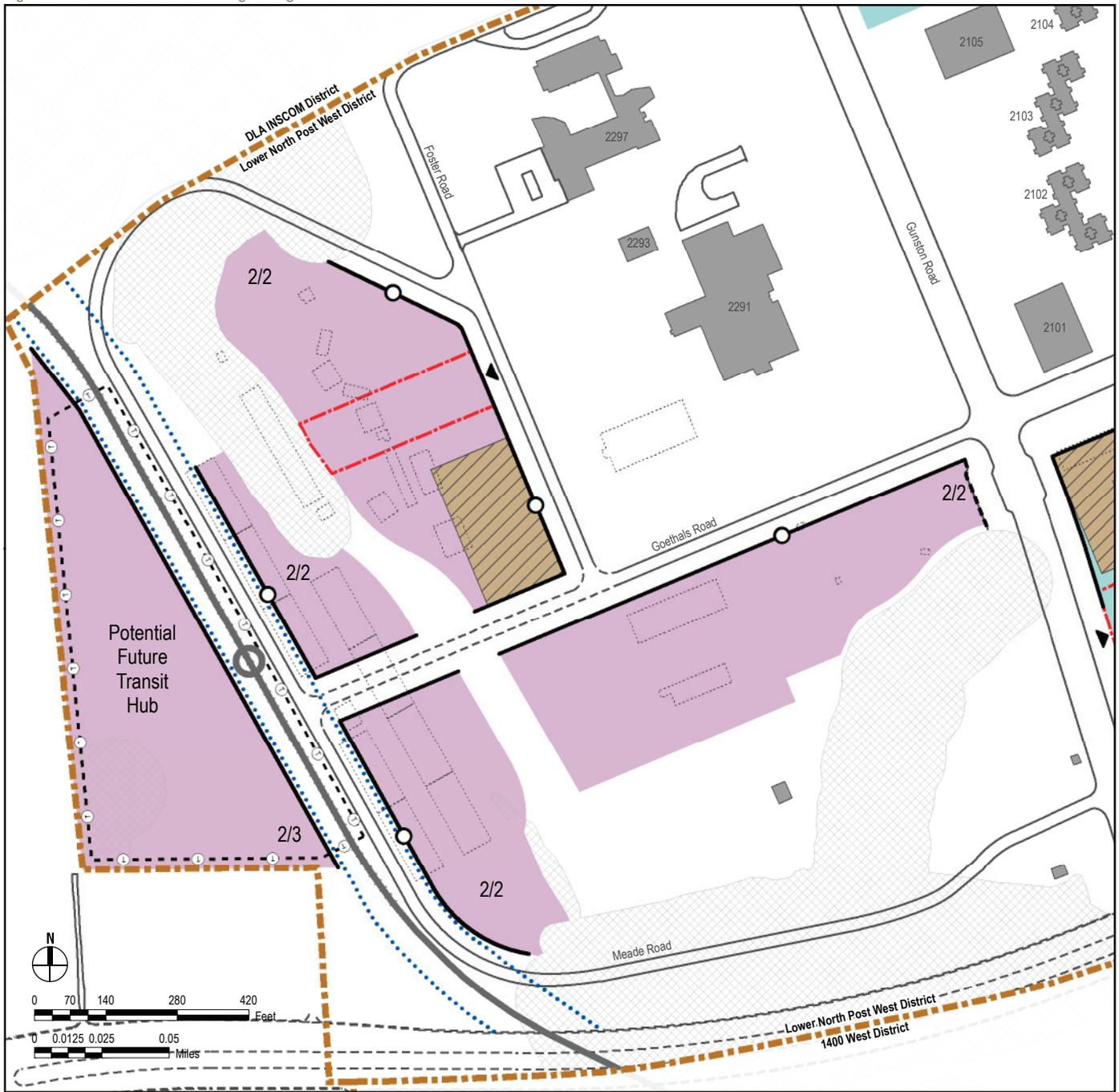
Parking is regulated in one area shown on the regulating plan. Beyond this area, parking and service lots may be placed anywhere within a development parcel depending on the final project design and program requirements. It is anticipated that paved surface lots will be implemented to accommodate all parking and storage needs. For additional details on parking lot design, see Chapter 4.

The area west of Meade Road may potentially become a transit hub for installation commuters in the long-term/. Given the proximity to Route 1 and the existing rail corridor, this area of the installation possesses the best opportunity to link several transit systems together including car/van pools, shuttles, transit buses, and rail. Further study is necessary to assess and determine the potential for a regional transit hub.

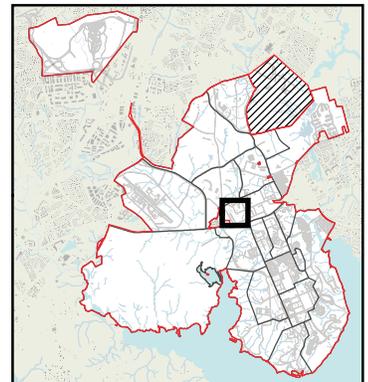
Open Space

Areas reserved for open space within this district are mainly for environmental constrained areas, building setbacks from the roads, and existing development. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and limited stormwater management systems. Larger stormwater management facilities may be placed in larger areas adjacent to development parcels, or may be located within the development parcel when space is constrained.

Figure 2.6: Lower North Post Regulating Plan: West Side



- | | |
|---------------------------------------|---|
| 2/4 Min. / Max. Building Height | ◀▶ Open Space Corridor |
| ▶ Primary Vehicle Entrance | ▨ Constrained Development Areas |
| — Existing Road | ■ Industrial Development Parcel |
| - - - Future Road | ■ Professional / Institutional Development Parcel |
| - - - District Boundary | ▨ Building - Demo |
| ⊙ Potential Enhanced Transit Corridor | ■ Building - Existing |
| ⊙ Potential Transit Station | ■ Building - Proposed |
| ⋯ Utility / Transit Corridor | ▨ Parking Zone |
| — Required Build-To-Line | ▨ Near Term Project |
| - - - Required Setback Line | |



Lower North Post Regulating Plan: Central Area

The central area of the Lower North Post District is located north of U.S. Route 1, and bounded by Gunston Road to the west, Goethals Road to the north, Constitution Road to the east, and the new entrance road/gate to the south. The area is planned to be redevelopment for new administrative office buildings, that mimic the buildings that currently exist along Goethals Road. Near-term projects entail a new Headquarters facility for the 29th Infantry at the corner of Goethals and Gunston Roads, and a new access control point known as the Lieber Gate. Longer-term development will be administrative buildings within the development parcel adjacent to building 1901.

Road Configuration

Goethals and Gunston Roads will maintain their current configuration. A new entrance road and security gate will provide additional access from Route 1 and connect with Gunston Road. To provide a second means of spanning Route 1 and connecting North and South portions of the installation, Constitution Road will be extended southward from its current intersection with Goethals Road. The long-term plan calls for the road to bridge over the entrance road/gate and Route 1. The southern end of Constitution Road will link up to the street grid within the Medical District and the 1400 East District. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of a development pattern that is intended to create a denser grouping of activities. Their placement must be orthogonal to the street grid, with uniform setbacks from the edge of the road. Buildings shall relate to adjacent structures in terms of height, form, and massing. For additional details on building prototypes and standards, see Chapter 3. The following building prototypes are appropriate within the development parcels:

- Administrative
- Parking Garage/Deck

The overall effect is that no one building is visually prominent. Instead, all the buildings contribute equally to the redevelopment of this area. Additionally, height restrictions and viewshed protections are active in this district for historic preservation purposes. For further details regarding these restrictions, refer to Chapter 2 of the VDP - Cultural Resources and/or Appendix B of this IPS - Historic Preservation.

Parking

Parking and motor pool lots are consolidated into one area behind the buildings to lessen their visual prominence from primary streets. Close proximity to buildings also minimizes walking distances to facilities. It is anticipated that parking and vehicle storage will be paved surface lots. However, multi-story garages may be employed as development and employee population increases. For additional details on parking lot design, see Chapter 4.

Open Space

Areas reserved for open space within this district are mainly building setbacks from the road, setbacks from the entrance road, recreation facilities, and existing development. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. Open space corridors must be accounted in the plan although their placement may vary. These are needed to provide pedestrian access, stormwater flow, and utility laterals. If needed, stormwater management facilities may be placed within the development parcel.

This district also has historic preservation viewshed restrictions that can affect the type of open space development. For further details on these restrictions, refer to Chapter 2 of the VDP - Cultural Resources.

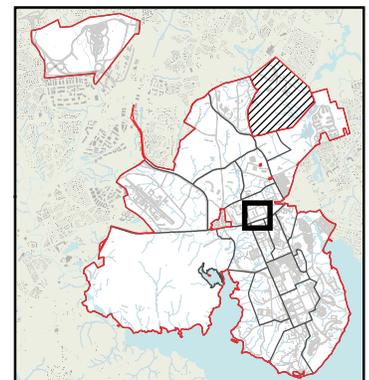
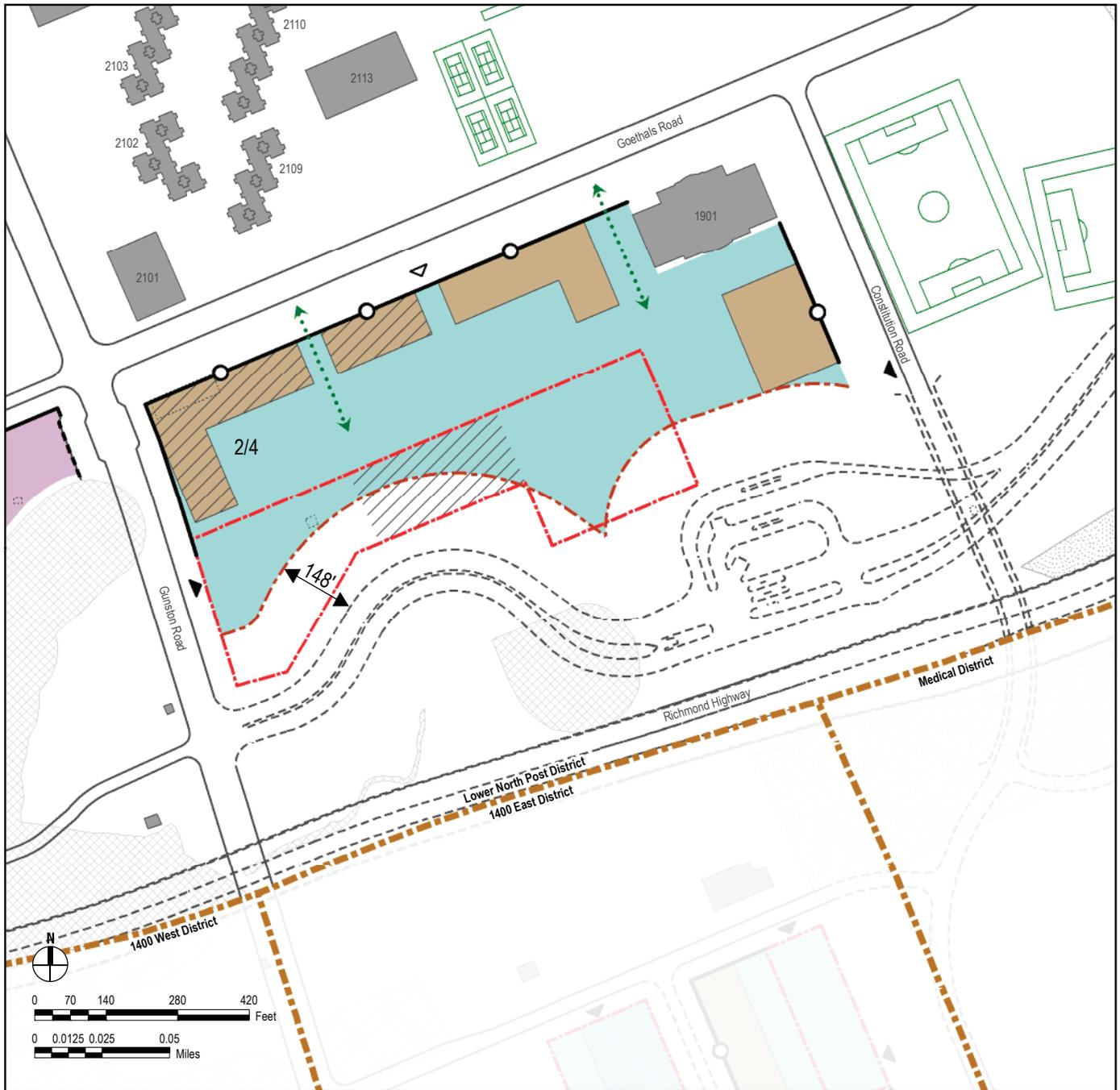


Center for Army Analysis



The OCAR Headquarters north facade (top) and south facade (bottom) exemplify the type and size of building within this district, and how to place it within the development parcel.

Figure 2.7: Lower North Post Regulating Plan: Central Area



Lower North Post Regulating Plan: East Side

The east side of the Lower North Post District site is located between the troop athletic fields and Lewis Village. It is bounded by Beaugard Road to the west, Abbot Road to the north, Woodlawn Road to the east, and Goethals Road to the south. As shown in Figure 2.8, most of the site is undevelopable from either natural or man-made constraints. The existing temporary facilities on the site will be demolished to create developable space for future professional/institutional facilities. The newest development in this area was a child development center between Franklin Road and Woodlawn Road. Long-term development calls for administrative buildings along Goethals Road, and community facilities (such as youth and child centers, gyms, religious facilities) between Franklin and Woodlawn Roads.

Road Configuration

There are no changes anticipated to the existing road infrastructure, as the alignments of the current street grid will remain the same. The only major improvement is the eastern extension of Goethals Road that is planned to connect to Woodlawn Road. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of an urban development that comprise a variety of functional prototypes. To maintain a consistent urban appearance, building placement must be orthogonal to the street grid, with uniform road setbacks. Structures must relate to their adjacent counterparts in terms of height, form, and massing. For additional details on building prototypes and standards, see Chapter 3. The following building prototypes are appropriate within the development parcels:

- Administrative
- Civic
- Commercial
- Parking Garage/Deck

The overall effect is that no one building is visually prominent. Instead, all the buildings contribute equally to the redevelopment of this area. Additionally, height restrictions and viewshed protections are active in this district for historic preservation purposes. For further details regarding these restrictions, refer to Chapter 2 of the VDP - Cultural Resources and/or Appendix B of this IPS - Historic Preservation.

Parking

Parking areas are typically behind or to the side of buildings to lessen their visual prominence. Close proximity to buildings also minimizes walking distances to facilities. It is anticipated that parking will be surface lots, but may be converted to multi-story garages as development and population increases. For additional details on parking lot design, see Chapter 4.

Open Space

Areas reserved for open space within this district are mainly for environmental constraint areas, existing development, recreation facilities, and building setbacks. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. Open space corridors must be accounted in the plan although their placement may vary. These are needed to provide pedestrian access, stormwater flow, and utility laterals. If needed, stormwater management facilities may be placed within the development parcel.

This district also has historic preservation viewshed restrictions that can affect the type of open space development. For further details on these restrictions, refer to Chapter 2 of the VDP - Cultural Resources.

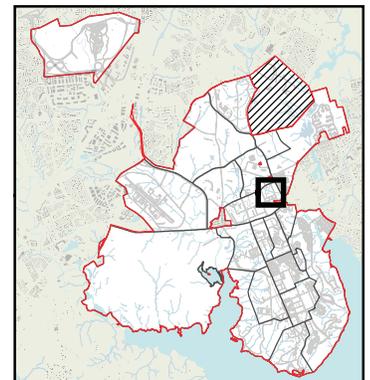


The new CDC, located along Abbot Road, sets the precedence for site planning and architectural design for community facilities in the district.

Figure 2.8: Lower North Post Regulating Plan: East Side



- | | |
|---------------------------------|---|
| 2/4 Min. / Max. Building Height | Constrained Development Areas |
| Primary Vehicle Entrance | Community Development Parcel |
| Entry Location | Professional / Institutional Development Parcel |
| Existing Road | Building - Demo |
| Future Road | Building - Existing |
| District Boundary | Building - Proposed |
| Required Build-To-Line | Parking Zone |
| Required Setback Line | Near Term Project |
| Open Space Corridor | Parking Garage - Proposed |
| MWR Recreation Framework | BRAC PA Restricted Area |



1400 West Area Regulating Plan

The 1400 West Area District is located on the South Post and bounded by Gunston Road to the east, and Pohick Road/sloped terrain to the south, east, and north. The existing warehouse facilities here are aging, and some are vacant. This affords an opportunity for redeveloping the entire area into an administrative office complex. The land area would be ideal for a major mission partner needing a contiguous land area for its administrative campus, or can be comprised of several buildings housing multiple mission partners. Transit opportunities exist for a station that can provide immediate access to this employment hub. Long-term development will re-envision this area as a new administrative center for a single tenant, or a campus hub for multiple tenants. Increased population in this area can merit the development of a new transit station.

Road Configuration

The re-envisioning of this area allows for the re-configuration of the road network to allow better integration with the surrounding street networks, and maximum development potential for the site. The proposed orthogonal street grid is employed to match development patterns already in existence. New roads will be aligned with existing intersections along Gunston Road to reduce the current number of curb-cuts and left turns. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of a development pattern that is intended to create a dense grouping of administrative activities. Their placement must be orthogonal to the street grid, with uniform setbacks from the edge of the road. Buildings shall relate to each other in terms of height, form, and massing. The following building prototypes are appropriate within the development parcels:

- Administrative
- Parking Garage/Deck
- Mixed-Use

The overall effect is that no one building is visually prominent. Architectural detailing may be employed to articulate a prominent corner or primary entrance. If multiple buildings are to be sited here, each shall contribute equally to the visual character of this district. If a single mission partner building is to be sited here, it may employ a more iconic character, with distinctive facade articulation to designate it as a focal structure. For additional details on building prototypes and standards, see Chapter 3.

Additionally, height restrictions and viewshed protections are active in this district for historic preservation purposes that may affect maximum building heights and development. For further details regarding these restrictions, refer to Chapter 2 of the VDP - Cultural Resources and/or Appendix B of this IPS - Historic Preservation.

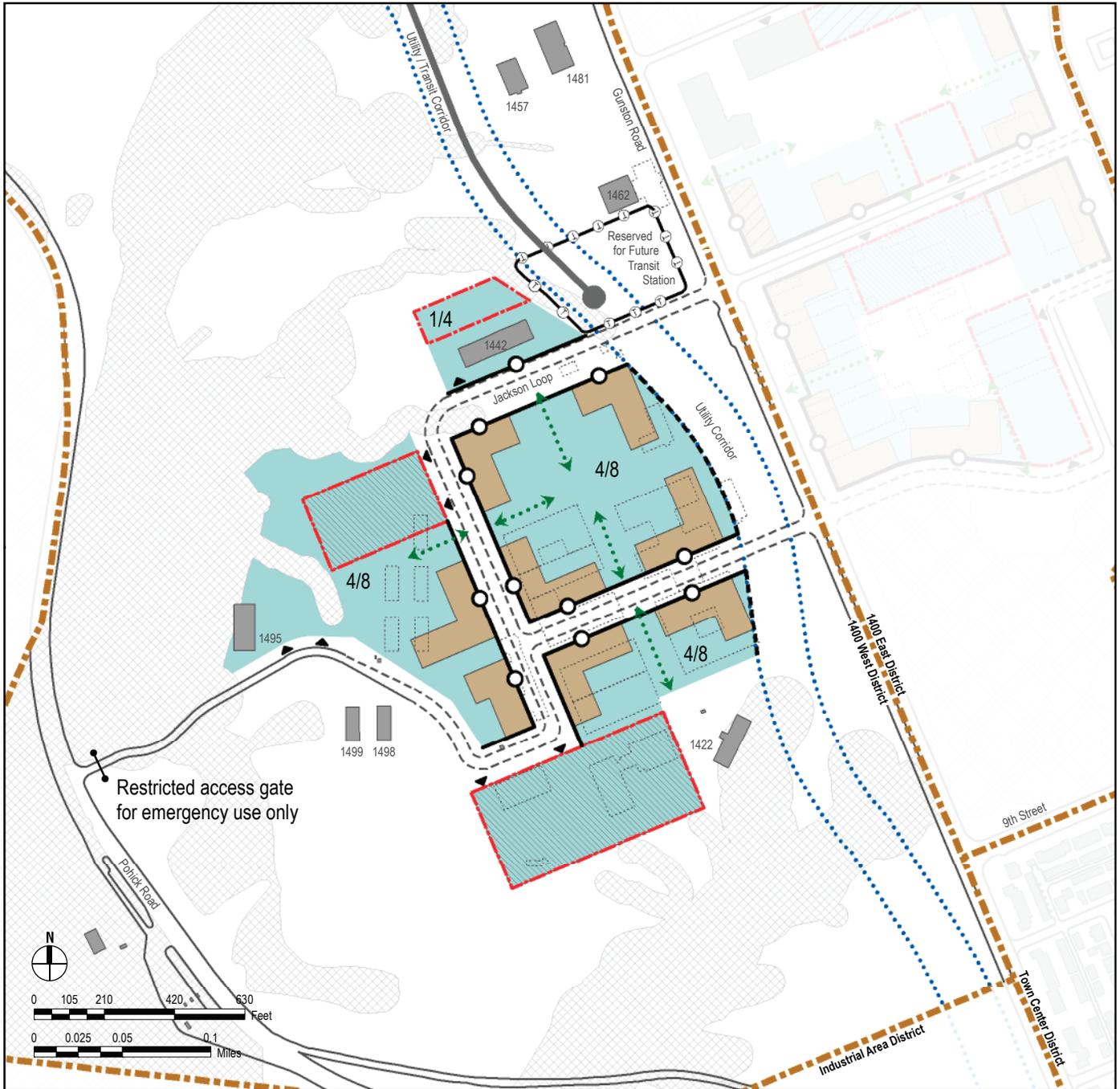
Parking

Parking is consolidated into three areas toward the periphery of the development parcels. This will limit their visual prominence from primary roads and are accessed via secondary and tertiary roads. The southernmost and westernmost areas are intended to be consolidated parking that will service multiple buildings and mission partners. Paved surface lots may be implemented in early phases, but are anticipated to convert to multi-level garages as additional development occurs. For additional details on parking lot design, see Chapter 4.

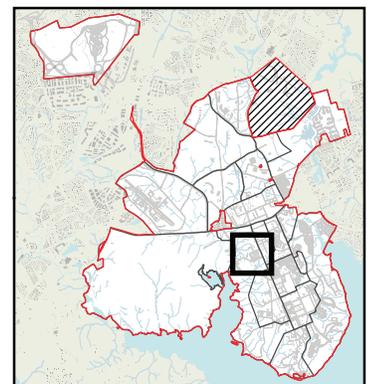
Open Space

Areas reserved for open space within this district are mainly building setbacks from the road, transit and utility corridors, and existing development. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. Open space corridors must be accounted in the plan although their placement may vary. These are needed to provide pedestrian access, stormwater flow, and utility laterals. If needed, storm water management facilities and additional public open space may be placed within the development parcel.

Figure 2.9: 1400 West Area Regulating Plan



- | | |
|--|---|
| 2/4 Min. / Max. Building Height | --- Required Setback Line |
| ▶ Primary Vehicle Entrance | ◀▶ Open Space Corridor |
| ○ Entry Location | ▨ Constrained Development Areas |
| — Existing Road | ■ Professional / Institutional Development Parcel |
| - - - Future Road | □ Building - Demo |
| ... Utility / Transit Corridor | ■ Building - Existing |
| ⊕ Transit Station | ■ Building - Proposed |
| --- District Boundary | □ Parking Zone |
| ● Potential Terminus Enhanced Transit Corridor | ▨ Parking Garage - Proposed |
| — Required Build-To-Line | |



1400 East Area Regulating Plan

The 1400 East Area District is located on South Post between Gunston Road on the west, 1st Street on the north, Doerr Road on the east and 6th Street to the south. Considerable redevelopment is projected to occur here as temporary and obsolete buildings are replaced with modern facilities. This regulating plan proposes higher density professional/institutional buildings for administrative offices, and multi-story parking garages. Near-term projects include a secure administrative facility south of building 1450. Long-term plans will in-fill development parcels with additional administrative facilities as the need for growth occurs.

Road Configuration

The original orthogonal grid of the roads is to be maintained and expanded upon to create a complete grid of interconnected streets. The major improvements involve extending the east-west roads to connect Gunston Road and Doerr Road. This will allow better vehicular and pedestrian flow into and through the site, as well as access to parking and buildings. Exact alignment of new roads such as 6th Street are to be evaluated for environmental impacts at the time of road design. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of an overall urban composition that is intended to create a consistent visual theme. Their placement must be orthogonal to the street grid, with uniform setbacks from the edge of the road. Buildings shall relate to adjacent structures in terms of height, form, and massing. The following building prototypes are appropriate within the development parcels:

- Administrative
- Parking Garage/Deck

The overall effect is that no one building is visually prominent. Instead, all the buildings contribute equally to the redevelopment of this area. For additional details on building prototypes and standards, see Chapter 3.

Parking

Parking is allocated in areas that are in close proximity to office buildings, and may be shared by more than one organization. Access shall be from secondary or tertiary roads. Parking may be surface lots in the near term, but will eventually need to become multi-level structures to accommodate increases in employee population. Setbacks for parking lots and structures shall match the building

setbacks to create a uniform street frontage.

Open Space

Areas reserved for open space within this district are mainly for environmental constraint areas, tree preservation, and building setbacks. Open space reserved at the center of highly-developed blocks will provide landscaped and tree preservation opportunities, as well as some stormwater management. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. Open space corridors must be accounted in the plan although their placement may vary. These are needed to provide pedestrian access, stormwater flow, and utility laterals.



USALSA administrative offices and courtyard.

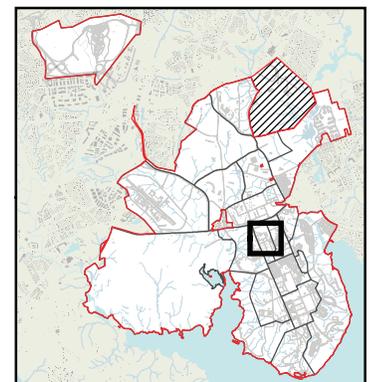


USALSA administrative offices located northeast of the site across Gunston Road is an example of the type of development appropriate for this Regulating Plan.

Figure 2.10: 1400 East Area Regulating Plan



- | | |
|---------------------------------|---|
| 2/4 Min. / Max. Building Height | Constrained Development Areas |
| Primary Vehicle Entrance | Professional / Institutional Development Parcel |
| Entry Location | Building - Demo |
| Existing Road | Building - Existing |
| Future Road | Building - Proposed |
| District Boundary | Parking Zone |
| Required Build-To-Line | Near Term Project |
| Required Setback Line | Parking Garage - Proposed |
| Open Space Corridor | |



South Post Community Support Regulating Plan

The South Post Community Support District is located on the South Post and is bounded by Belvoir Road to the west, U.S. Route 1 to the north, and the Installation boundary and adjacent district to the east and south. As this district becomes developed, it is envisioned as a mix of support facilities for Soldiers, military families, and the adjacent hospital. Current development includes a child development center (CDC), and Fisher House. Near-term projects call for additional Fisher House, Privatized Army Lodging (PAL) hotel. Long-term projects entail a medical office building, and recreation fields.

Road Configuration

A single tertiary access road will provide access to this district. It will parallel Belvoir Road and act as a spine along which various facilities will be fronted. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are a small enclave of community functions that are strung along a frontage road. To maintain a consistent appearance, their placement must be orthogonal to Belvoir Road, sited along a single setback line. The close proximity will establish a visual group of structures that should share similar proportions in terms of height and form. The following building prototypes are appropriate within the development parcels:

- Civic
- Commercial
- Administrative
- Parking Garage/Deck

The overall effect has buildings of a uniform appearance. Similar architectural styles will ensure that no one structure is more prominent than the others. For additional details on building prototypes and standards, see Chapter 3.

Height restrictions and viewshed protections are also active in this district for historic preservation purposes. For further details regarding these restrictions, refer to Chapter 2 of the VDP - Cultural Resources and/or Appendix B of this IPS - Historic Preservation.

Parking

Parking zones are typically behind or to the side of buildings to lessen their visual prominence from primary streets. Close proximity to buildings also minimizes walking distances to facilities. It is anticipated that parking will be surface lots. The northernmost parking zone located in the BRAC Programmatic Agreement Restricted Area is intended to allow a surface parking and ancillary infrastructure to support proposed recreational planned facilities. For additional details on parking lot design, see Chapter 4.

Open Space

Areas reserved for open space within this district are mainly for environmentally constrained areas, recreation facilities, building setbacks, and utility corridors. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. If needed, stormwater management facilities may be placed within the development parcel.

According to the 2007 BRAC Programmatic Agreement (PA) the land designated as BRAC PA Restricted Area on Figure 2.11 shall be reserved for open space with future development restrictions to avoid adverse effects on adjacent historic properties. These restrictions include:

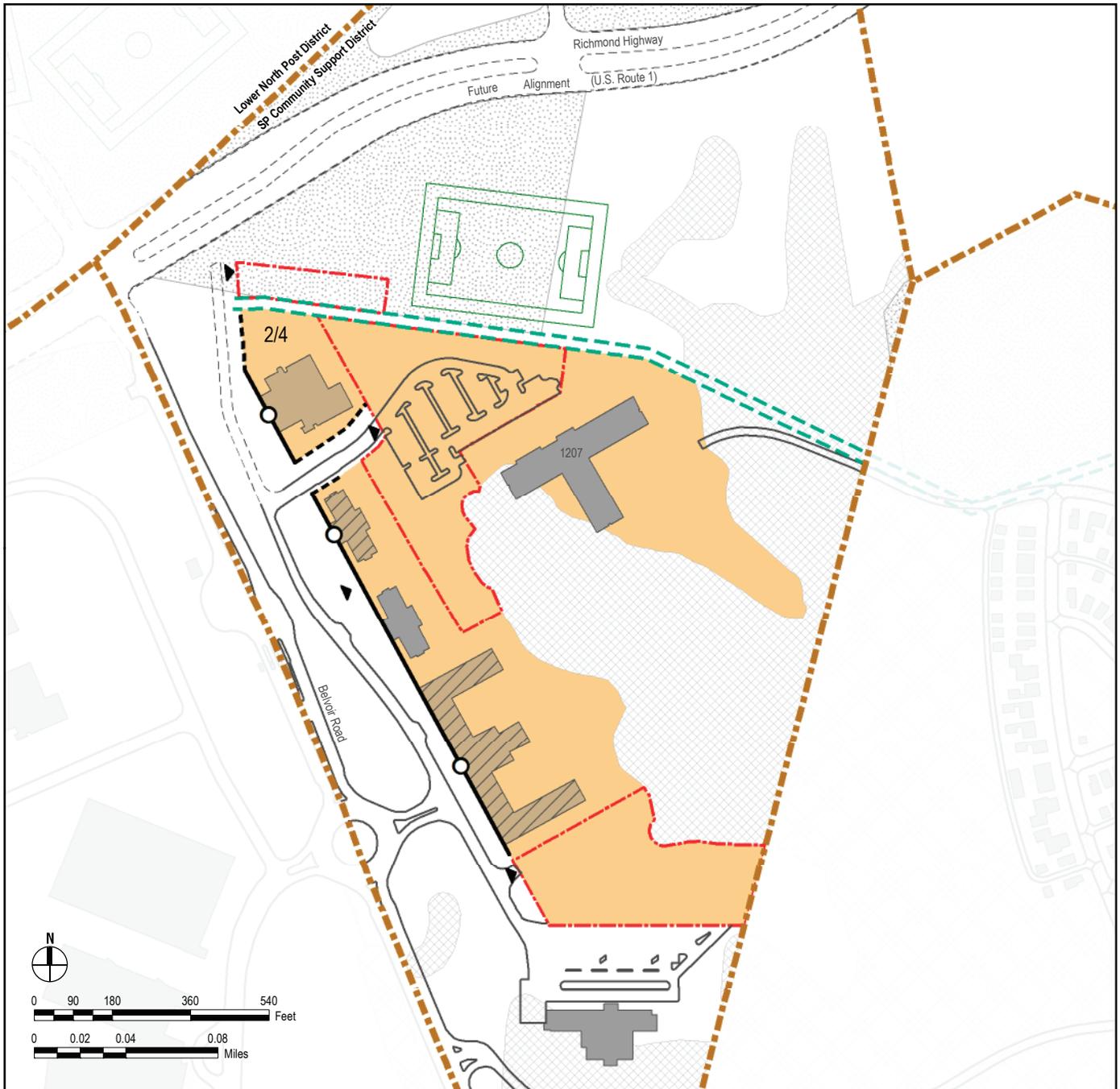
- Land designated as open space can include recreational fields, wooded areas, grassed areas other than recreation fields, stormwater management facilities (provided that landscape screening be installed), and infrastructure such as roads and utilities.
- Permanent development shall be limited to small buildings and structures which support utilities, security requirements, or outdoor recreation. Any construction in areas designated as open space will be treated as new undertakings and will be subject to compliance with and consultation with the Consulting Parties pursuant to 36 CFR Part 800.
- Where any new construction, unrelated to this BRAC Action, is proposed that may infringe upon areas designated as open space, Fort Belvoir shall commit to developing strategies to avoid or minimize all adverse effects and shall consult with the Consulting Parties, pursuant to 36 CFR Part 800.

In accordance with the BRAC PA, the parking zone shown in Figure 2.11 is limited to surface parking only to support recreational uses.

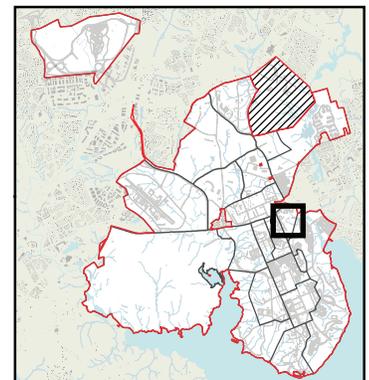


The Child Development Center set the precedence for architectural style, form and massing within this district.

Figure 2.11: South Post Community Support Regulating Plan



- | | |
|---------------------------------|---------------------------------|
| 2/4 Min. / Max. Building Height | — MWR Recreation Framework |
| ▶ Primary Vehicle Entrance | ▨ Constrained Development Areas |
| ○ Entry Location | ■ Community Development Parcel |
| — Existing Road | ▨ Building - Demo |
| - - - Future Road | ■ Building - Existing |
| — District Boundary | ■ Building - Proposed |
| — Sanitary Easement | ▨ Parking Zone |
| — Required Build-To-Line | ▨ Near Term Project |
| — Required Setback Line | ▨ BRAC PA Restricted Area |



Industrial Area Regulating Plan

The Industrial Area District is located on the south post and bounded by Gunston Road to the east. 21st Street/Clapp Road/Warren Road to the south, and two adjacent districts to the west and north. Most of facilities here are aging and in derelict condition, which presents a prime opportunity to redevelop this area with modern and efficient warehousing facilities, motor pool storage. There is also available land that can be utilized for in-fill. Near-term projects include a regional stormwater collection facility, Pet Care Center, Headquarters for the 249th Battalion, fueling station, warehouses, and an information systems facility. The industrial functions that currently reside in this area Most functions will continue to remain in this location, although the facilities in which they reside will be redeveloped as older facilities are demolished.

Road Configuration

The future condition will maintain the system of roads, and preserve their existing alignments and widths. The major improvements include a new road on the western side of the district that roughly parallels Theote Road. This will establish a grid of tertiary access roads outlining rectilinear development parcels. Warren Road will be realigned slightly to improve its intersection with Theote Road. Existing rail track beds may be used for access drives to provide ingress and egress to mid-block development parcels. All road improvements will maintain the grid pattern of streets and match up with the existing road infrastructure at key intersections. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area will have a very specific utilitarian or operational mission function. Hence the likelihood of great variation in building size, form, and mass. To establish some semblance of order, building placement must be orthogonal to the street grid. Setback from the roads may vary depending on the ultimate size of the building, and its ancillary program requirements. Unless otherwise shown, buildings can be located anywhere within the development parcel, subject to program requirements and approval by the Garrison. The following building prototypes are appropriate within the development parcels:

- Warehouse/Flex-Space
- Administrative

The overall effect will be of large warehouse structures that have a utilitarian function and appearance, with a simple architectural design character. For additional details on building prototypes and standards, see Chapter 3.

Parking

Parking is regulated at two areas shown on the regulating plan. Beyond these two areas, parking and service lots may be placed anywhere within a development parcel depending on the final project design and program requirements. It is anticipated that paved surface lots will be implemented to accommodate all parking and storage needs. The RV storage lot that exists on the southeast corner of Theote Road and 16th Street will be relocated to North Post in a location situated between the golf course and Telegraph Road. For additional details on parking lot design, see Chapter 4.

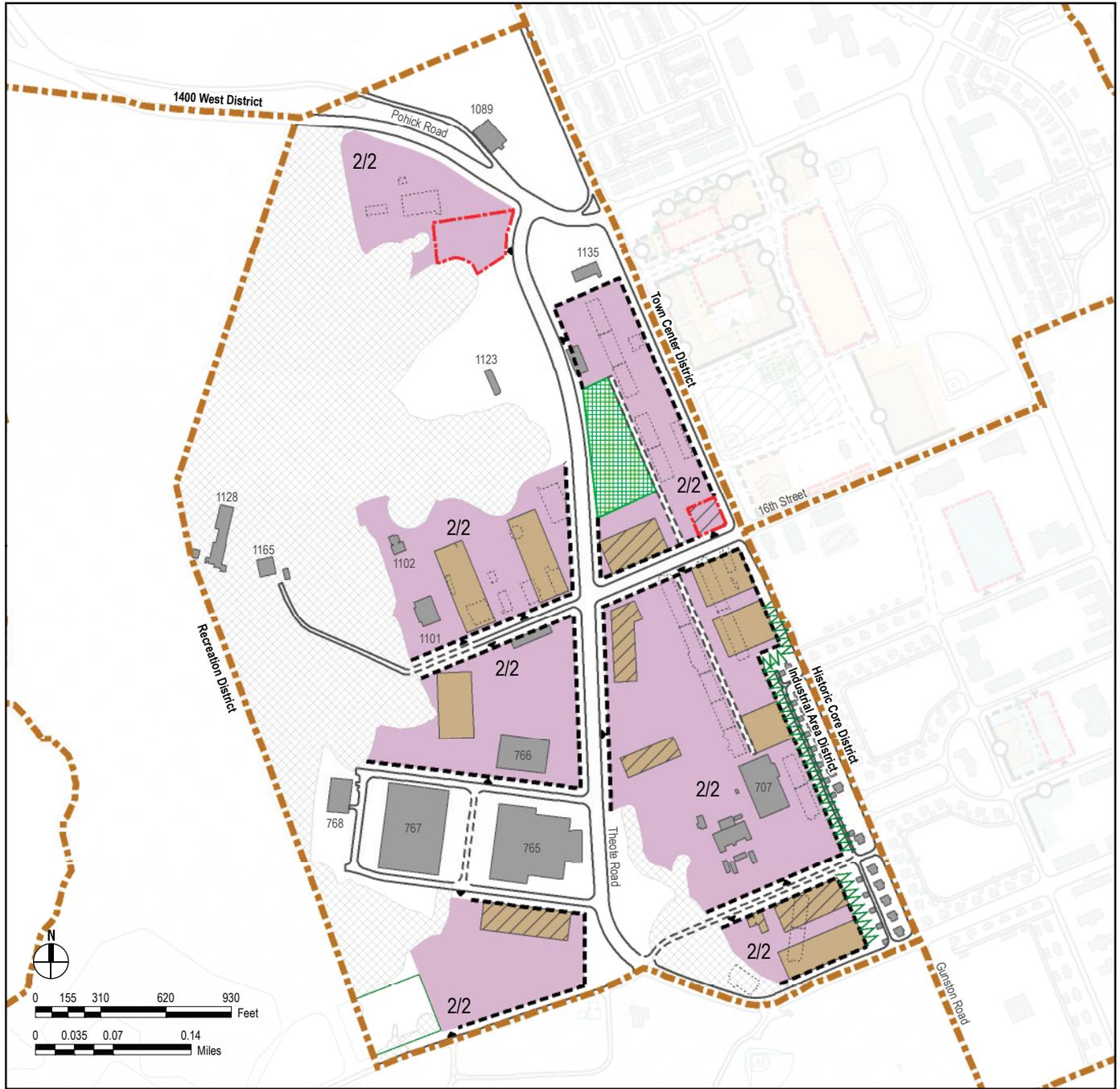
Open Space

Areas reserved for open space within this district are mainly building setbacks from the road, environmental constraints, utility infrastructure, and existing development. Areas that are designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems. If needed, storm water management facilities and additional public open space may be placed within the development parcel. Buffer improvements between housing and the industrial uses will entail vegetative plantings and berms to visually separate the two land uses.

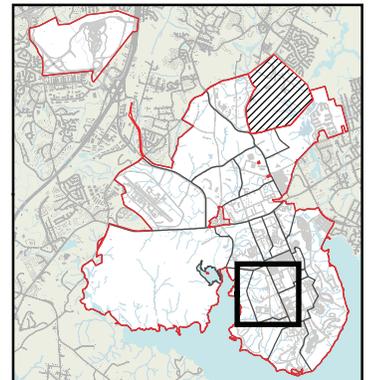


Museum Support Center, located along Theote Road, is development typical for the industrial area district.

Figure 2.12: Industrial Area Regulating Plan



- | | |
|---------------------------------|-------------------------------|
| 2/4 Min. / Max. Building Height | Constrained Development Areas |
| Primary Vehicle Entrance | Industrial Development Parcel |
| Entry Location | Building - Demo |
| Existing Road | Building - Existing |
| Future Road | Building - Proposed |
| District Boundary | Parking Zone |
| Required Build-To-Line | Near Term Project |
| Required Setback Line | Stormwater Management |
| Open Space Corridor | Maintain Buffer |



Town Center Regulating Plan

The Town Center District is on the South Post and bounded by Gunston Road to the west, 12th Street to the north, Belvoir Road to the east, and 16th Street to the south. Aging and vacant facilities, along with the desire to expand community services at this central location mean a prime opportunity for redevelopment. The regulating plan proposes community functions, which will allow for a mix of retail, administrative, residential, and recreational facilities. Mirroring the type of dense mixed-use development north of 12th Street, this area is intended to have higher densities of functions with a mix of surface and multi-level parking. Near-term projects are a new replacement fire station and multi-purpose recreation field. Long-term projects will in-fill the development parcels with community facilities such as a recreation center and multi-use buildings that can accommodate retail on the ground floor and residential or administrative uses on the upper floors.

Road Configuration

Redevelopment means an entirely new system of roads that access the site. Major improvements include Middleton Road that will bisect the block in a north-south direction. East-west connector roads (13th, 14th, and 15th Streets) will allow access into the site and connect Gunston Road with Middleton Road. The new road configuration will honor the surrounding orthogonal, and integrate seamlessly at key intersections. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of an urban development that comprise a variety of functional prototypes. To maintain a consistent urban appearance, building placement must be orthogonal to the street grid, with road setbacks that match adjacent buildings. Structures must relate to their adjacent counterparts in terms of height, form, and massing. The following building prototypes are appropriate within the development parcels:

- Mixed-Use
- Commercial
- Civic
- Administrative
- Residential
- Parking Garage/Deck

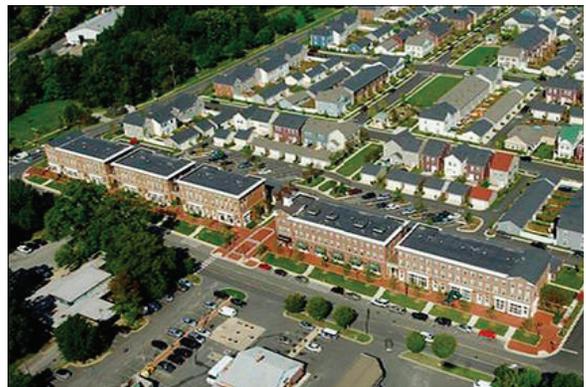
The overall effect is that no one building is visually prominent. Instead, all the buildings contribute equally to the redevelopment of this area. For additional details on building prototypes and standards, see Chapter 3.

Parking

Parking is allocated in areas that are in close proximity to buildings, and may be shared by more than one building mission partner. Access shall be from secondary or tertiary roads. Parking may be surface lots in the near term, but may eventually become multi-level structures to accommodate increases in employee population. Setbacks for parking lots and structures shall match the building setbacks to create a uniform street frontage. Parking east of Middleton Road represents the maximum area for consolidation of existing and future parking, and will serve multiple users.

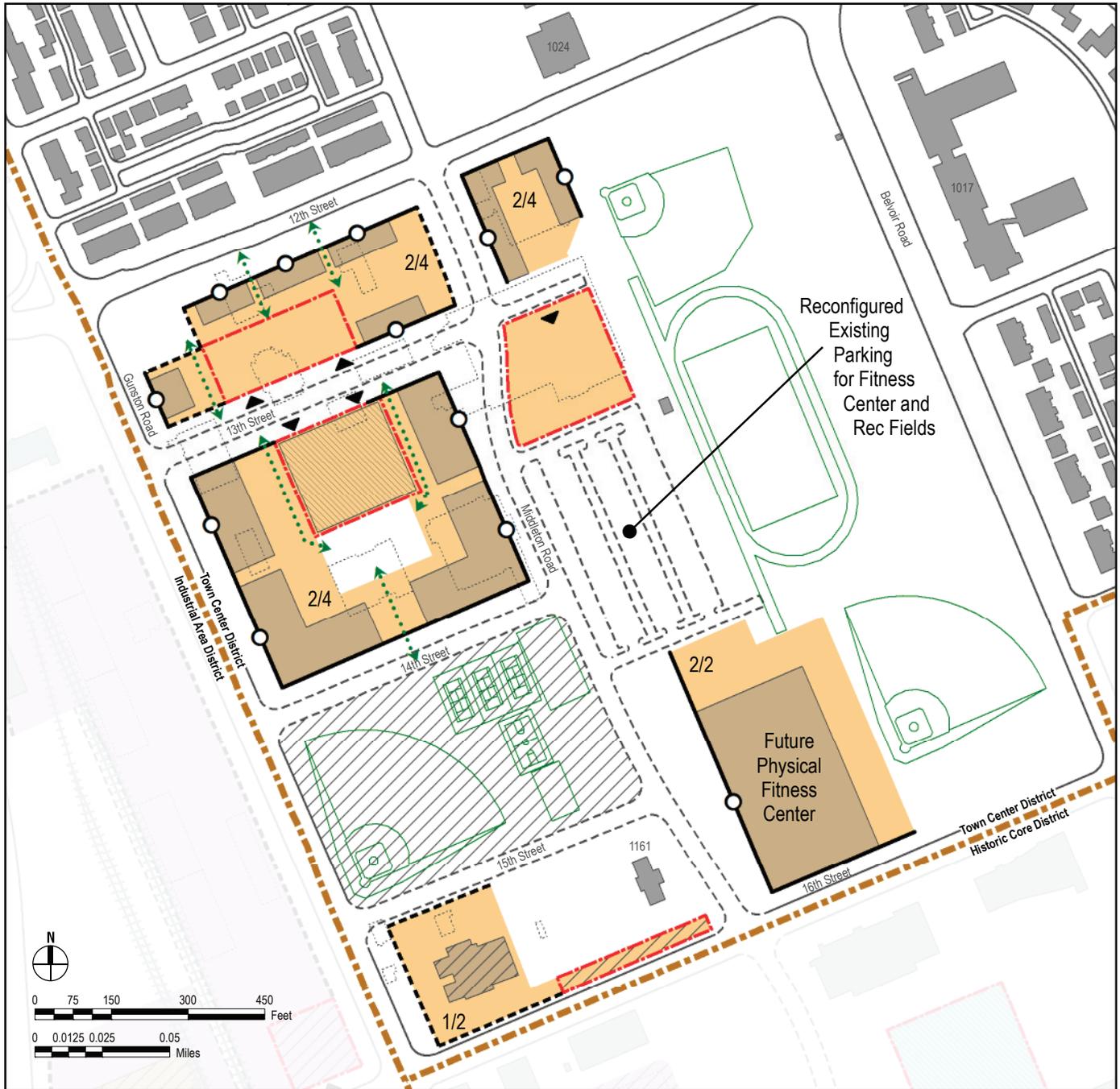
Open Space

Areas designated as open space are reserved for recreation facilities, pedestrian outdoor space, tree preservation/ reforestation, utilities, and building setbacks. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. Open space corridors are mandated to pass through development parcels although their placement may vary from what is shown on the plan. These will provide mid-block passage for pedestrians, stormwater flow, and utility laterals.

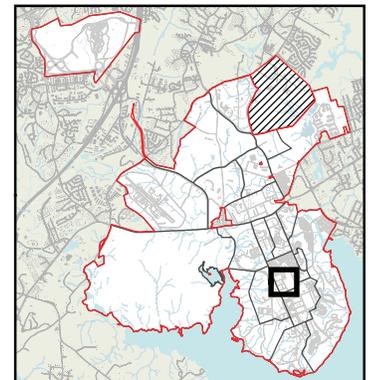


Aerial view of the 12th Street Town Center development that shall be mirrored on the south side of the street to complete the mixed-use corridor.

Figure 2.13: Town Center Regulating Plan



- | | |
|---------------------------------|---------------------------------|
| 2/4 Min. / Max. Building Height | — MWR Recreation Framework |
| ▶ Primary Vehicle Entrance | ▨ Constrained Development Areas |
| ○ Entry Location | ■ Community Development Parcel |
| — Existing Road | ⋯ Building - Demo |
| ⋯ Future Road | ■ Building - Existing |
| — District Boundary | ■ Building - Proposed |
| — Required Build-To-Line | ▭ Parking Zone |
| ⋯ Required Setback Line | ▨ Near Term Project |
| ↔ Open Space Corridor | ▨ Parking Garage - Proposed |



Historic Core Regulating Plan

The Historic Core District is located on the South Post within the historic district. It is bounded by Middleton Road to the west, 16th Street to the north, Belvoir Road to the east, and 21st Street to the south. The area is mostly developed, with a few parcels permitting in-fill development to occur. In-fill development is planned to be administrative offices or institutional facilities for the Defense Acquisition University. Areas for parking are for a mix of surface and multi-story garages. Future development will complement the Colonial-Revival and Neo-Colonial Revival architecture which is prominent in the District. See the Cultural Resource section of the Vision and Development Plan, and the Historic Preservation standards in Appendix B for additional design guidance. Long-term development will entail in-fill projects that are strategically placed remedy gaps in the street frontage. Uses will be structured parking, and educational / administrative facilities.

Road Configuration

Overall, there are no changes to the existing road infrastructure that is planned. The only major improvement is the construction of Middleton Road that will connect 18th and 16th Streets. All other roads will maintain their current configuration and alignments. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of an historic development that has unique architectural character. Future buildings must maintain the district's integrity with uniform street setbacks, and matching the height, form, and massing of adjacent structures. The following building prototypes are appropriate within the development parcels:

- Administrative
- Parking Garage/Deck

The intent of new buildings is to visually integrate with existing surroundings in a way that honors the original intent for development. For additional details on building prototypes and standards, see Chapter 3.

Parking

Parking is designated to two areas: to the north an accessed from 18th Street, and a central location between 19th and 20th Streets. Both locations help to maintain close proximity to facilities, but keep their visual prominence to a minimum. The northernmost location along 18th Street is intended as a three-level garage. It's height and street frontage is intended to blend with surrounding buildings. The new garage is intended for student parking during their commutes to the installation for short-term training sessions. For additional details on parking lot design, see Chapter 4.



New professional/institutional facilities proposed in the Regulating Plan shall match existing facilities' scale, form, and style such as the DAU building.

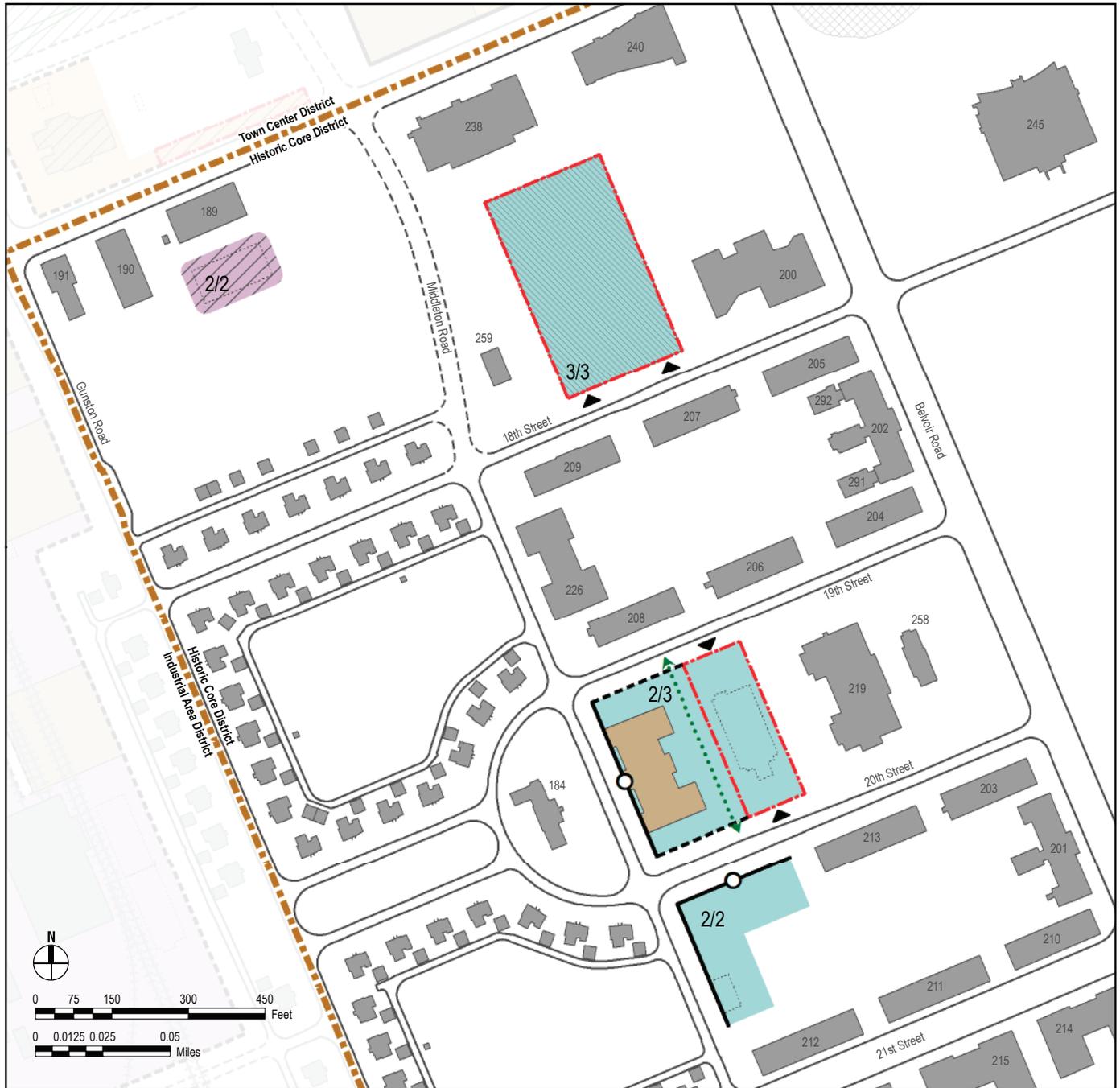
Open Space

Areas designated as open space are reserved for recreation, ceremonial functions, pedestrian outdoor space, tree preservation, utilities, and building setbacks. Given that this area is built-out, open space is not anticipated to change in the foreseeable future. In areas that are deemed suitable for growth, open space that is designated for building setbacks will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. Open space corridors are mandated between the proposed long-term building and the parking area (between 19th and 20th Streets) as a means of mid-block access for pedestrians, and potential stormwater flow and utility laterals.

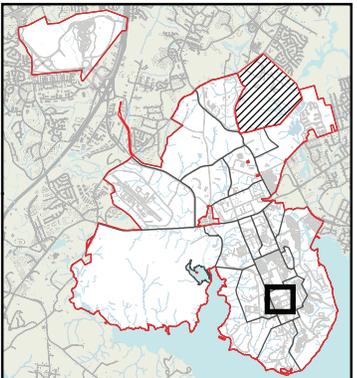


Historic Core Regulating Plan context aerial image.

Figure 2.14: Historic Core Regulating Plan



- | | | |
|---------------------------------|--|---|
| 2/4 Min. / Max. Building Height | | Constrained Development Areas |
| | | Professional / Institutional Development Parcel |
| | | Industrial Development Parcel |
| | | Building - Demo |
| | | Building - Existing |
| | | Building - Proposed |
| | | Parking Zone |
| | | Parking Garage - Proposed |
| | | Open Space Corridor |



Administrative Campus Regulating Plan

This district is located on South Post and bounded by Belvoir Road to the west, Vernondale Village to the north, wooded steep terrain to the east, and 12th Street/Stimson Road to the south. The area is planned to be completely redeveloped once the former DeWitt Hospital is demolished. This centrally located district is envisioned as an administrative office complex, with close access to the 12th Street Town Center and other community amenities. This could be the site for a single large mission partner facility, or comprised of several buildings housing multiple mission partners. Long-term development is projected to be high density with multiple buildings arranged to frame outdoor spaces and create quadrangle for public use.

Road Configuration

Redevelopment of this area will result in new road infrastructure. The adjacent roads will be maintained and extended to provide access into the district. New roads will maintain the grid alignment and integrate with existing streets at key intersections. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area are part of a development pattern that is intended to create a dense grouping of administrative activities. Their placement must be orthogonal to the street grid, with uniform setbacks from the edge of the road. Buildings shall relate to each other in terms of height, form, and massing. The following building prototypes are appropriate within the development parcels:

- Administrative
- Parking Garage/Deck
- Mixed-Use

The overall effect is that no one building is visually prominent. Architectural detailing may be employed to articulate prominent corners, primary entrance, or where it is intended to frame open space. If multiple buildings are to be sited here, each should contribute equally to the visual character of this district. If a single mission partner building is to be sited here, it may employ a more iconic character, with distinctive facade articulation to designate it as a focal structure. For additional details on building prototypes and standards, see Chapter 3.

Height restrictions and viewshed protections are also active in this district for historic preservation purposes. For further details regarding these restrictions, refer to Chapter 2 of the VDP - Cultural Resources and/or Appendix B of this IPS - Historic Preservation.

Parking

Parking is limited to two areas at the northern and southern periphery of the development parcel. The location helps to lessen their visual prominence from primary streets. Lots are intended to service all the facilities on the site, and therefore are to be shared by all mission partners located here. It is anticipated that surface lots will be implemented in early phases. As additional development occurs, structured parking will be employed. For additional details on parking lot design, see Chapter 4.

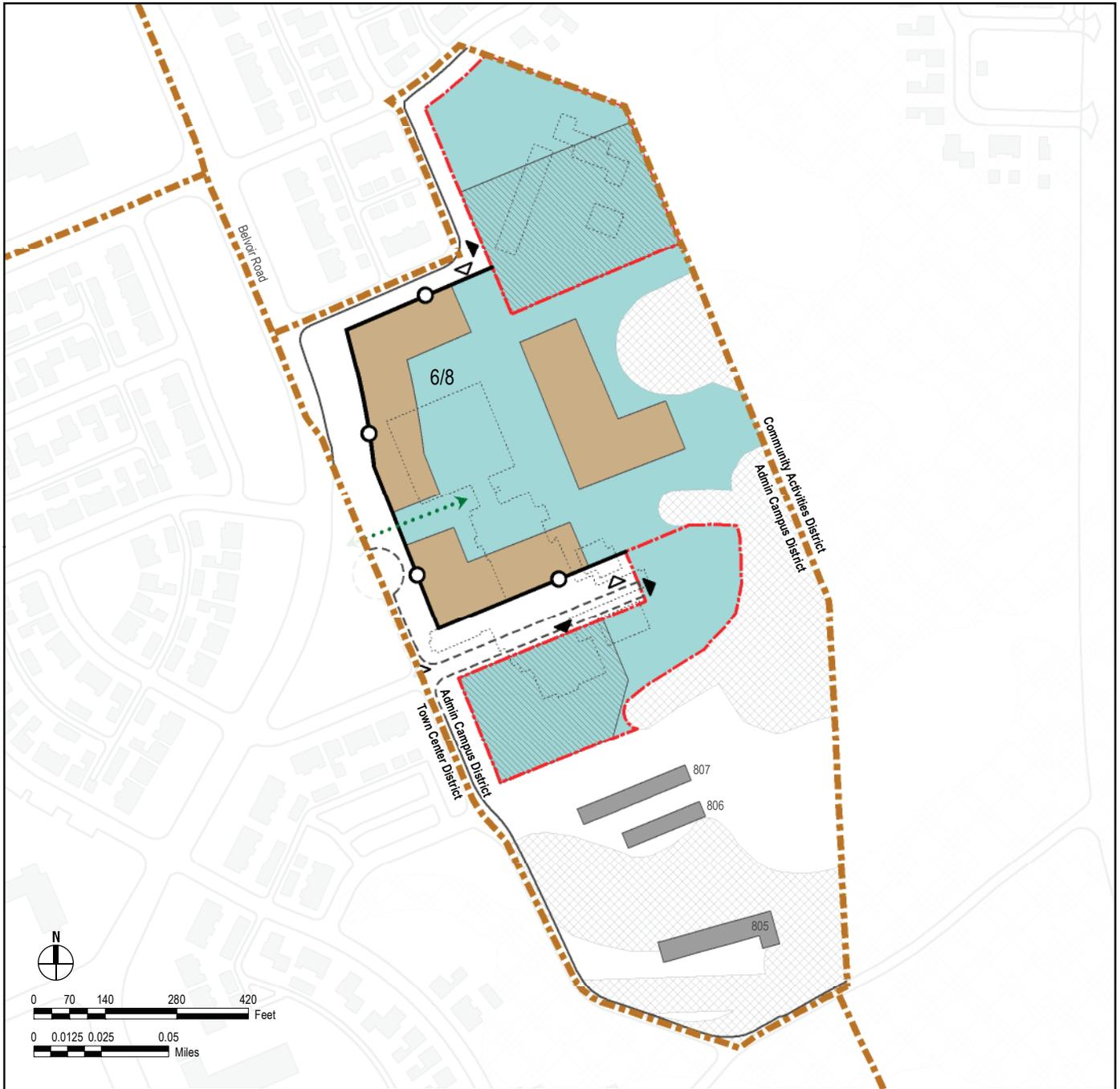
Open Space

Areas reserved for open space within this district are mainly building setbacks from the road, environmental constraints, and existing development. Open space designated for building setback will allow room for pedestrian streetscape, utility corridors, and innovative stormwater management systems that can be implemented within an urban area. Open space corridors must be accounted in the plan although their placement may vary. These are needed to provide pedestrian access, stormwater flow, and utility laterals. If needed, stormwater management facilities and additional public open space may be placed within the development parcel.

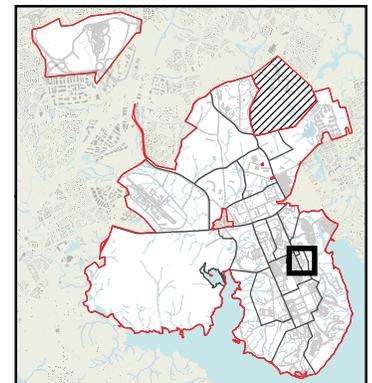


The Carlyle Crescent Center, located in Alexandria, Virginia, exemplifies a higher density multi-mission partner office building appropriate for the Administrative Campus District.

Figure 2.15: Administrative Campus Regulating Plan



- | | |
|---------------------------------|---|
| 2/4 Min. / Max. Building Height | ↔↔ Open Space Corridor |
| ▶ Primary Vehicle Entrance | ▨ Constrained Development Areas |
| ▷ Secondary Vehicle Entrance | ■ Professional / Institutional Development Parcel |
| ○ Entry Location | ⋯ Building - Demo |
| — Existing Road | ■ Building - Existing |
| - - - Future Road | ■ Building - Proposed |
| — District Boundary | □ Parking Zone |
| — Required Build-To-Line | ▨ Parking Garage - Proposed |



Fort Belvoir North Area (East and West Campuses) Regulating Plan

Fort Belvoir North Area (FBNA) district is remotely located approximately two miles northwest of the Main Post with direct access to Interstate 95. Two areas are identified for future development. The east campus is a single contiguous land area bounded by Barta Road to the north, Heller Road to the east and south, and the National Geospatial-Intelligence Agency to the west. The west campus is comprised of three land areas bounded by the Fairfax County Parkway to the west, Barta Road/Heller Road to the east, and the Installation boundary to the north and south. Both areas are undeveloped and can undergo immediate development with minimal little to no displacement of other functions. The long-range plans envision an administrative complex for either a single large mission tenant needing a sizable campus, or an employment hub of office buildings for multiple mission partners.

Road Configuration

Heller Road and Barta Road will be maintained as the perimeter loop that permits access into and through this district. Within each development parcel, the road infrastructure must be built to suit the future programmed needs that eventually locate here. Road alignments are assumed to be more irregular in keeping with topography and suburban development patterns. Proposed roads will intersect with either Heller and Barta Roads in a location that is logical and allows adequate visibility. The locations indicated here are only notional. For further details on road prototypes and profiles, see Chapter 4.

Buildings

Buildings in this area will be within a suburban development character where buildings are set within a naturalistic/manicured landscape setting. Buildings are intended to be centrally placed within the development parcel, and hence have a visual prominence. Hence the architectural treatment of the buildings is one that will showcase the focal importance of the structure. Ancillary buildings should relate to the primary structure(s) in terms of style and form, but not in hierarchy. The following building prototypes are appropriate within the development parcels:

- Administrative
- Iconic/Campus
- Commercial
- Parking Garage/Deck

The overall effect is a suburban office park with multiple buildings housing many mission partners, or a corporate campus for a single large mission partner headquarters. For additional details on building prototypes and standards, see Chapter 3.

Parking

Parking may occur in any location within the development parcel, and will be dependent upon the final planning program and design layout. It is expected that the majority of parking will be accommodated by multi-level garages. Surface lots are permitted, but should be limited to keep impervious surfaces to a minimum. For additional details on parking lot design, see Chapter 4.

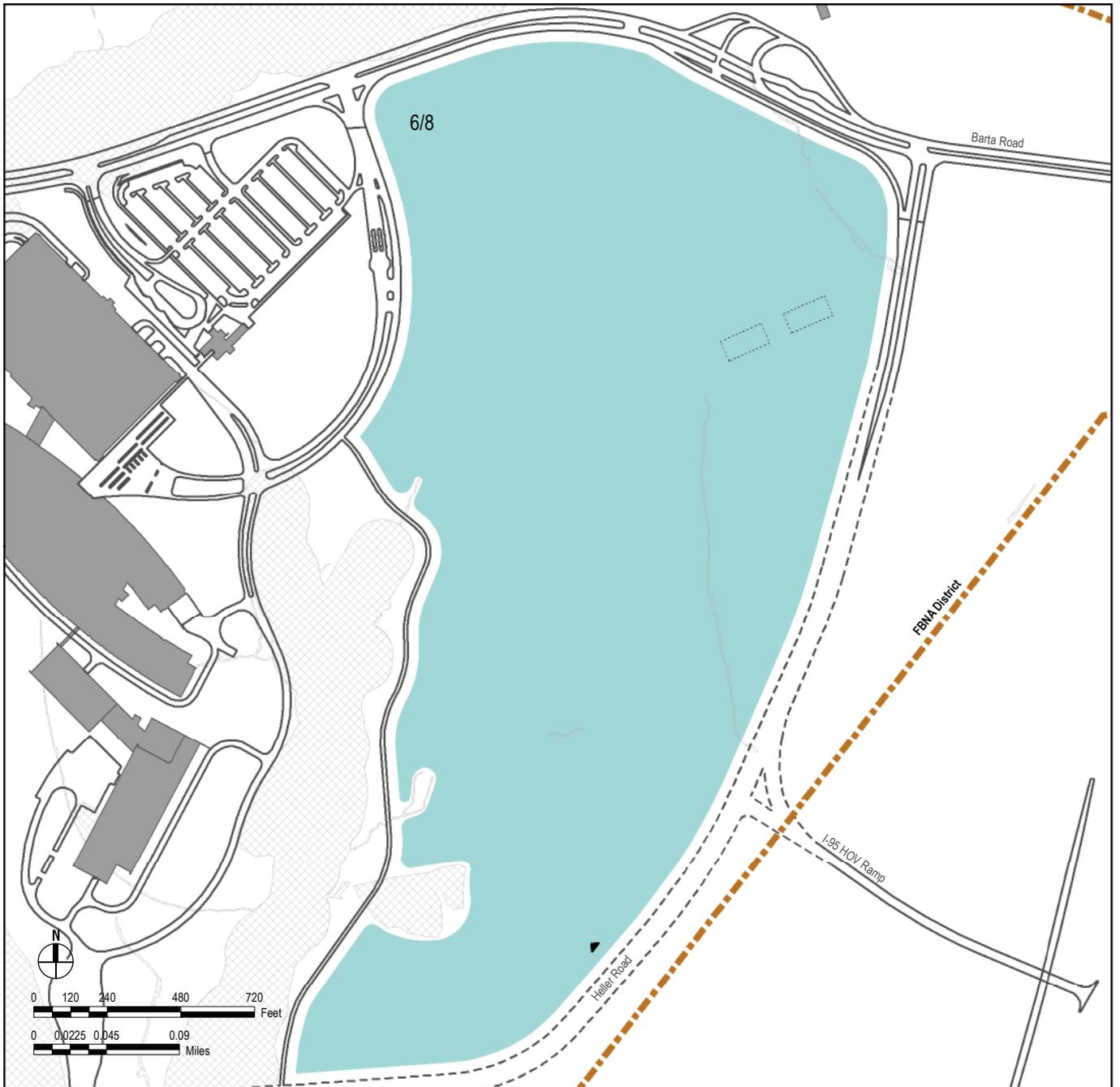
Open Space

Open space within this district is currently encompassing environmentally constrained areas, and setbacks. As future development is programmed for stormwater management, utility corridors, pedestrian green spaces/circulation, landscaping, and/or recreational facilities, it is intended to locate these functions within the development parcels. This will allow the greatest preservation of open space to accommodate environmental constraints and necessary setbacks.



National Geospatial-Intelligence Agency Campus East typifies the type of development that is projected for this district.

Figure 2.16: Fort Belvoir North Area Regulating Plan: East Campus



- | | |
|---------------------------------|---|
| 2/4 Min. / Max. Building Height | —+— District Boundary |
| ▶ Primary Vehicle Entrance | ▨ Constrained Development Areas |
| — Existing Road | ■ Professional / Institutional Development Parcel |
| - - - Future Road | ⋯ Building - Demo |
| +++ Existing Rail | ■ Building - Existing |

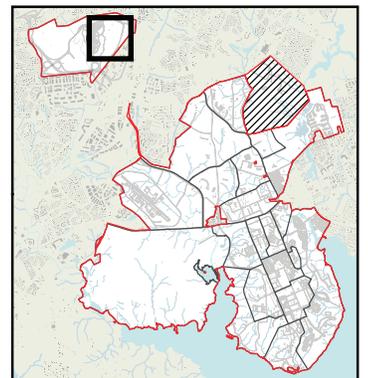
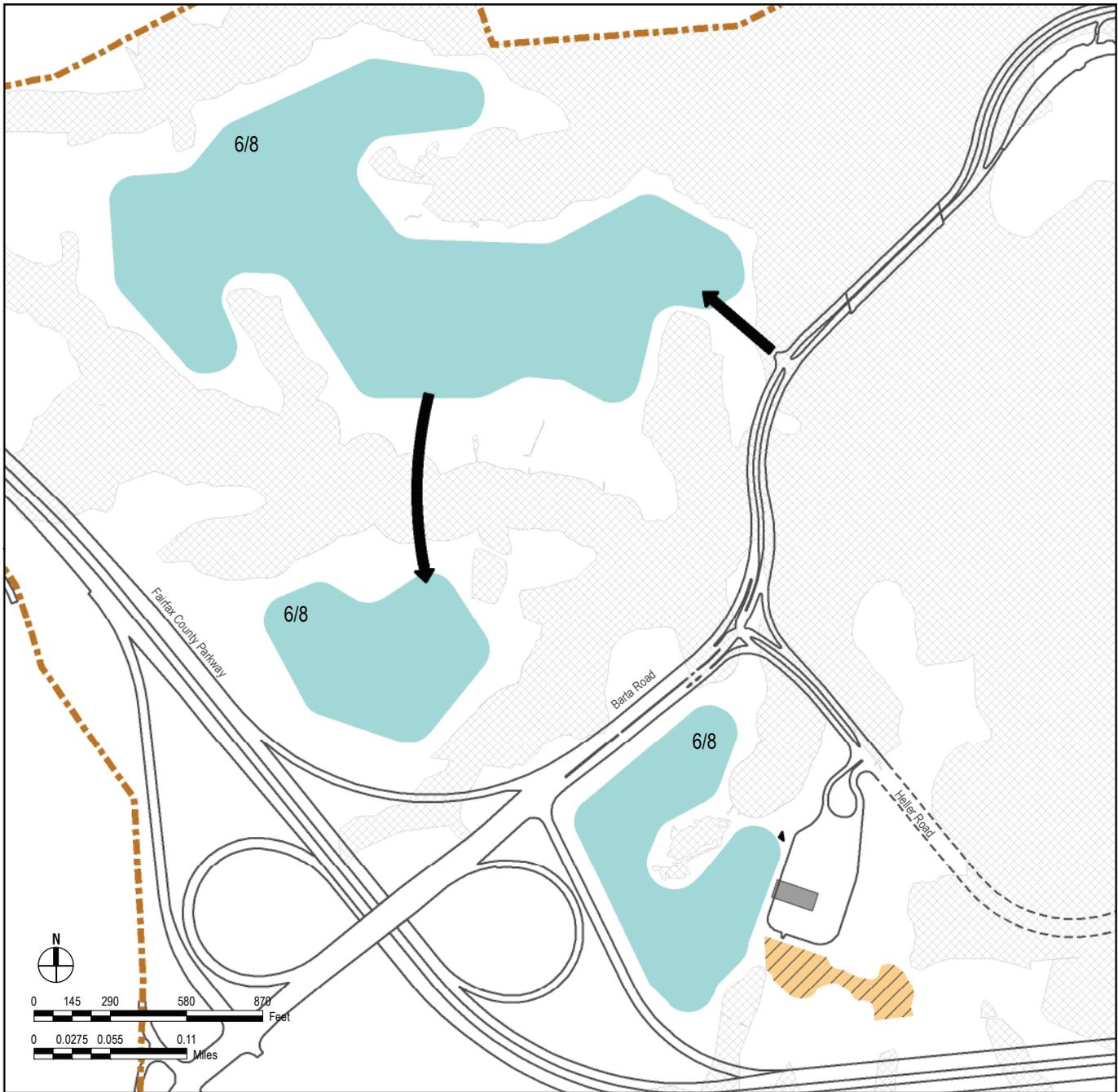
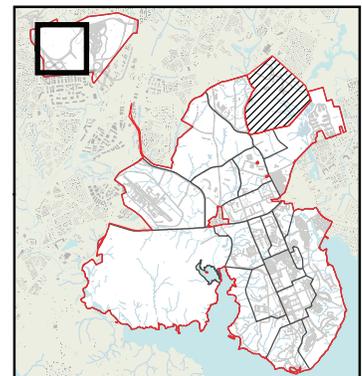


Figure 2.17: Fort Belvoir North Area Regulating Plan: West Campus



- | | |
|---------------------------------|---|
| 2/4 Min. / Max. Building Height | Constrained Development Areas |
| Primary Vehicle Entrance | Professional / Institutional Development Parcel |
| Existing Road | Community Development Parcel |
| Future Road | Building - Demo |
| Existing Rail | Building - Existing |
| District Boundary | Near Term Project |



Sustainable Design and Development

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 impacts on the natural environment is achievable when we create high-performance, healthy, safe, and energy efficient buildings.

This section summarizes the sustainable design concept and its application to Army projects, viable future development, and the Regulating Plan. Each chapter following in the IPS will have a sustainable standards section providing guidance on implementation of sustainable building design, circulation, landscaping and site elements principles.

What is Sustainable Design?

Sustainable design and development is an integrated approach to planning, designing, building, operating, and maintaining facilities and infrastructure in a collaborative and holistic manner among all stakeholders. It is a systematic process and engineering practice with how-to guidance, checklists, 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 Fort Belvoir, sustainable design is the design, construction, operation, and reuse/removal of the built environment in an environmentally and energy efficient manner. The basic objectives of sustainability are:

- Reduce the consumption of energy, land materials, water, and other non-renewable resources.
- Minimize the waste of energy, land materials, water, and other limited resources.
- Protect the natural environment that is the source of all resources.
- Create livable, healthy, and fiscally productive man-made environments for existing and future generations.
- Design for sustainable environments, which 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.

The Integrated Design Process

Critical to the success of sustainable design, stormwater management, and development is the organization and commitment of the team to engage in the Integrated Design Process. To affect change in building design and operation, the project delivery process itself must become a collaborative effort – one that integrates design strategies among all disciplines and all players in the project delivery process. Integrated design demands a more inclusive team working 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)

At Fort Belvoir, the design team shall include the mission partners (various entities), the construction manager (generally the Corps of Engineers), contracted design team (architects and engineers) as well as representatives from Fort Belvoir Directorate of Public Works (DPW), and Fort Belvoir Emergency Services (Fire, Security), and Communications.

The planning charrette is a critical part of the process. Bringing the entire team together prior to initial design or funding request will ensure that all stakeholders' needs are addressed. It also ensures that costs are properly accounted for, thereby reducing overruns and delays later in the construction process.



The stormwater facility at NCE collects rain water and resuses it for irrigation on site.



Pervious pavers can reduce the site's impervious surfaces, allowing stormwater drainage and reducing the heat island effect.

Sustainable Design Principles

The principles of sustainable design can be categorized into five broad categories. These principles are detailed in the following chapters as they are applicable to buildings, circulation, landscaping, and site elements. Specific examples pertaining to Fort Belvoir shall be considered for implementation on Post projects. Below are sustainable design principles for site selection on the regulating plans.

- Wise site selection is the foundation for the project's success. The Regulating Plan parcels specifically target previously developed sites to reduce pressure on undeveloped land. If raw land must be developed, then care must be taken to avoid sensitive areas such as wetlands, prime agricultural land, areas located in flood plains, and other environmentally-sensitive areas. In addition, an evaluation of infrastructure requirements of developing the site and its impact on the land must be assessed.
- Locating new facilities near mass transportation, dense residential areas, or existing service facilities will reduce the need for automobile trips.
- Consider adaptive reuse of buildings, where possible, once their initial use is no longer required, especially in cases of historic structures. Demolition of historic structures shall be considered as a last resort.
- Once an appropriate site is selected, appropriate stormwater controls and building footprint must be selected to reduce the site's impact on the surrounding area.
- Thought must also be given to the site's hard surfaces and exterior lighting schemes as they can have a large impact on the building's energy efficiency.
- Pervious pavement shall be used instead of asphalt whenever possible to reduce the site's impervious surfaces.
- Parking lots shall be liberally divided with planting islands to reduce the heat island effect.
- New facility construction must meet federal, state, and local requirements for stormwater runoff quality and quantity control, as well as industry standards for sustainable design. These include:
 - Energy Independence and Security Act (EISA) of 2007, Section 438
 - Virginia Erosion and Sediment Control (VESC) regulations
 - Virginia Stormwater Management Program (VSMP) Permit regulations
 - Environmental Protection Agency (EPA) Chesapeake Bay Total Maximum Daily Load (TMDL) for Nitrogen, Phosphorus and Sediment
 - Fairfax County Public Facilities Manual (PFM)
 - LEED® Stormwater Design criteria

Building Design Standards

3

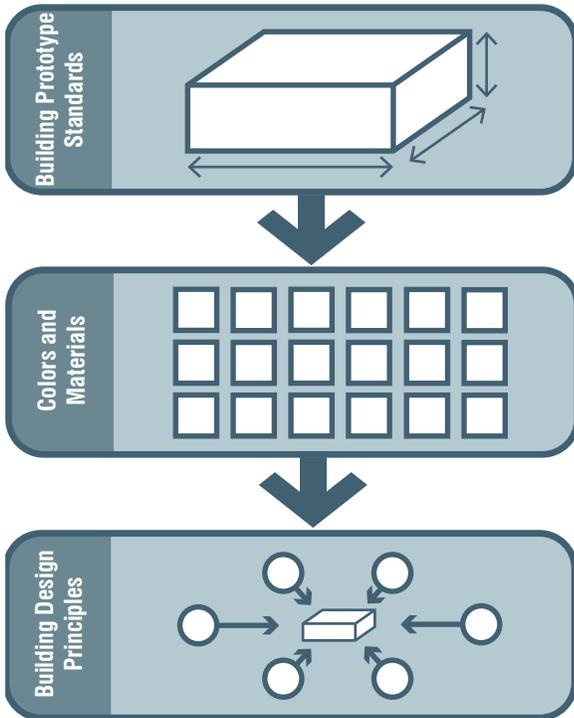


Figure 3.1: Building Design Standard Process

Introduction

Purpose

Buildings are the most dominant man-made features on an installation. Their architectural style and incorporation of building materials contribute considerably to the overall character of the Post. This chapter sets guidelines on what buildings shall look like, in order to ensure that Fort Belvoir continues to be a unique and beautiful place to see.

How to Use the Standards

This chapter offers design guidance for the exterior style, materials, and colors of buildings. It is divided into three sections that address separate topics but ultimately relate to one another in the final design of new construction or renovations. The sections are as follows:.

- **Building Prototype Standards:** this is a representation of very specific building typologies that can be found at the Installation. Think of this as a template guide that helps determine basic dimensions, overall size, shape, height, and placement. For each type of building typology, there is a pattern that it shall follow, so that adjacent structures can all visually relate to one another. This creates a uniform appearance that together creates a strong visual character that defines Fort Belvoir.
- **Colors and Materials:** this is a list of appropriate materials and colors for exterior facade applications. Think of this as a standardized palette of choices, from which a myriad of combinations can be made. Ultimately, the limited number of selections helps to maintain a uniform appearance, so that buildings maintain the overall character of Fort Belvoir. Not all districts/facilities will have colors and materials palettes provided in this chapter because they have their own unique palettes. These include: Intelligence District, DLA/INSCOM District, FBNA District, North Residential and Community Activities District, NMUSA, and the FBCH Complex.
- **Building Design Principles:** this provides general requirements that apply to all or most structures. Think of it as a primer in basic design. Presented are strategies and requirements that need to be considered for any type of new construction or renovation to ensure a higher quality environment for building occupants.



Table 3.1: Building Prototype Standards	
1. Plan	
<i>Placement</i>	
Regulates building setback from other buildings, roads, parking, and buildable area boundary.	
<i>Shape</i>	
Regulates building width, length, and what percentage of the building envelope must be built.	
2. Elevation	
<i>Use</i>	
Regulates allowable building uses on the ground and upper floors.	
<i>Height</i>	
Regulates floor-to-floor height, first floor ceiling height, and first floor finish ground elevation.	
3. Section	
<i>Fenestration/Materials</i>	
Regulates the required percentage of facade and roof area to be covered by a specific material provided in the Materials and Color section at the beginning of this chapter.	

When constructing new facilities or expanding existing buildings, the proposed location will determine what prototype is allowed and its basic design parameters. Determining the appropriate building prototype is a four-step process:

- Review the **Regulating Plan in Chapter 2** and find the project location site. Note the Required Build-to Line (RBL) and Required Setback Line (RSL). Note the color of the development parcel - this determines the primary use of the building appropriate for that location.
- Refer to the **building prototypes in this chapter**, which outlines the basic requirements such as placement, heights, function, and form.
- Refer to the **colors and materials in this chapter** for the applicable types of materials and their colors depending on the district where the building is located.
- Review the **design principles in this chapter** for additional recommendations on general design guidelines that are applicable for all building prototypes.

The architectural character of Fort Belvoir's buildings affect the overall Installation image. Building design must consider the neighborhood context and environment in which they are located. In general, building design shall follow these objectives:

- Adapt building design to the site and be complementary, if not similar, to adjacent structures.
- Favor higher densities and clustering buildings to conserve land and allow for maximum Anti-terrorism/ Force Protection (AT/FP) clearances.
- Accommodate adaptive reuse for changing missions and a longer life cycle for buildings
- Orient buildings to face the primary street or open space.
- Make the distinction between a building that needs to be a landmark, and one that blends with the adjacent context.

Building Prototypes

Fort Belvoir has a variety of building prototypes, each of which serves specific type of function and has a specific architectural character. The following prototypes are the most prevalent on the Post:

- Iconic/Campus
- Commercial
- Residential
- Administrative Office
- Mixed-Use
- Warehouse/Flex-Use
- Solider Housing
- Parking Garage/Deck
- Civic

Not all the building prototypes listed above will be regulated; however, most will be regulated for materials and colors which are presented in this document. The following building prototypes will not be regulated:

- **Iconic/Campus.** This building prototype is intended for large public facilities or for individual mission partners that require large administrative or research facilities. Examples include FBCH, the National Museum of the U.S. Army, NCE, DLA, INSCOM, and ADFE facilities. Because these facilities are self-contained campuses or are designed to meet unique mission partner requirements, they are not regulated in this document regarding form. However, renovations and/or expansions to the existing facilities' design shall be subject to approval by a design review board that is formed and overseen by the DPW.
- **Commercial.** The commercial building prototype includes stand-alone retail facilities that have standardized designs from the corporate level. This prototype may include the Post Exchange (PX), Commissary, restaurants, shoppette, car care center, and/or bank/credit union. Because these facilities often have standardized designs, they are not regulated regarding form in this document. However, due to their location on Post, building materials and colors are regulated in this IPS. Proposed projects, renovations and/or expansion to the existing facilities' design shall be subject to approval by a design review board that is formed and overseen by the DPW.
- **Residential.** Fort Belvoir Residential Communities LLC (FBRC) is responsible for the construction, operations, and maintenance of the residential villages on Fort Belvoir under a 50-year lease agreement; therefore, these facilities are not regulated. This program is part of the larger Military Housing Privatization Initiative (MHPI). The MHPI legislation allows developers to build housing to local standards.



Administrative: Garrison Headquarters



Mixed-Use: Fort Belvoir Town Center



Iconic/Campus: Fort Belvoir Community Hospital



Residential: George Washington Village



Missile Defense Agency (north side)



Office of the Chief Army Reserve



Fort Belvoir Garrison Headquarters - Abbot Hall



Administrative facilities at Davison Army Airfield

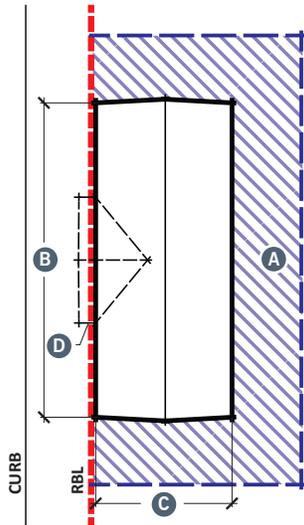
Administrative Buildings

This building prototype is intended for administrative offices that can be sited in various circumstances to accommodate a range of hierarchical functions. It may be employed to create a single, visually prominent structure, or contribute to the urban fabric as an ensemble of multiple buildings. Its exterior detailing will assume the architectural styles of adjacent buildings to promote a unified visual character within its setting. This prototype is the most prevalent on Post, and reflects its dominant administrative mission. Ancillary uses such as food service or small retail functions may be included within the building envelope to provide necessary services to employees. Standards for this prototype (Table 3.2) include:

- **Form:** The building shall be composed of simple and compound massing of rectilinear forms. Its placement and hierarchical function shall dictate its level of formality, and whether it assumes a symmetrical or asymmetrical arrangement of those forms. The sloped roof shall be symmetrical gabled or hipped. Sloped roofs are preferred over flat roofs wherever possible to maintain positive drainage on roof systems and provide design conformity. A flat roof with a parapet wall is permitted if it adequately complements other buildings.
- **Elevation:** The height shall be proportional to surrounding buildings, with a maximum of four stories allowed, unless otherwise specified in the regulating plan at eight stories maximum. Walls will have a constructional logic (of well-detailed brick and masonry work) that expresses a clear tripartite division of base, middle wall, and entablature. Setbacks may occur to reduce the appearance of the height. The first floor may also be set back to form a covered arcade or loggia. The main facade shall address the most prominent street or open space.
- **Windows:** Openings will normally be vertically proportioned, but in some cases be square, and complement the style of the building and adjacent structures. Openings shall be horizontally and vertically disposed to adhere to the constructional logic of the walls, and may be grouped or evenly spaced. Materials may be aluminum-clad wood, extruded aluminum, or hollow steel frame. Glass can be either clear or lightly tinted, but not reflective. Windows shall be fixed, single-hung, or double-hung.
- **Doors:** Openings will be clearly defined, with vertical or square proportions that match the style of the building. The primary entry will be emphasized to conform to the hierarchical order of ingress. Placement on the main facade shall be at the center of the building, unless an asymmetrical massing is employed. Materials shall be steel or extruded aluminum, and hinged. Doors may include glass panes in similar materials and configurations to complement the windows.

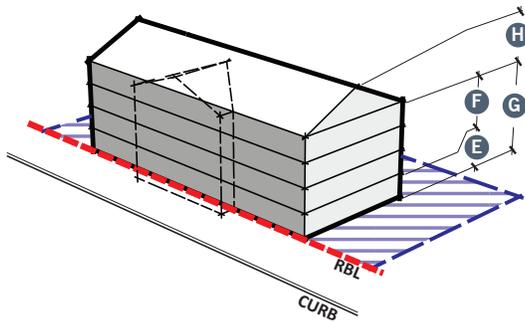
Table 3.2: Administrative Buildings

PLAN



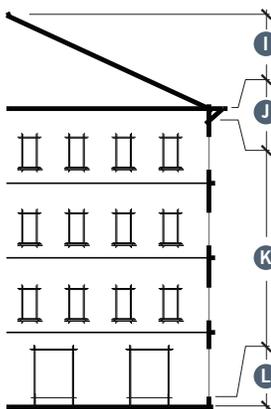
Placement	Dimension	
A Standoff from:	other buildings	36' min.
	ancillary structures	36' min.
	open spaces	0' min.
	parking	36' min.
B Building facade on RBL	25% min. of circumference	
C Building depth	100' max.	
D Portico depth	25' max.	

ELEVATION



Level	Use/Type	Dimension
E Ground floor	Administration	10'-15'
F Upper floors	Administration	10'-12'
G Maximum floors		Refer to Regulating Plan in Chapter 2
H Roof	Gable (5"/12" min. pitch), Parapet, or Flat	

SECTION



Component	Specifications
I Roof	Slope or flat form permitted - One building material/color: 100% coverage
J Wall Entablature	Permitted - One building material/color: 100% coverage
K Wall Facade	Primary Building Material/Color: 90-100% coverage
	Secondary Building Material/Color: 0-10% coverage
L Wall Base	Permitted - One building material/color: 100% coverage



12th Street - Town Center



Fort Belvoir Town Center



Fort Belvoir Welcome Center

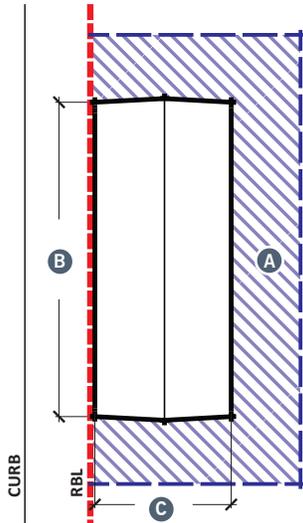
Mixed-Use Buildings

This building prototype is intended for areas where retail is an integral part of the street frontage in urban areas on Post. The variety of occupancy permutations allows for flexibility and diversity in Town Centers or "Main Streets," where mixed-use is desired. The first floor is primarily devoted to retail uses that may actively engage the street. Upper floors can be occupied by either office or residential uses, or both. This prototype is meant to function as part of an ensemble of buildings that contributes to the street frontage. The exterior detailing will complement the architectural styles of adjacent buildings to promote a unified visual character; however, a reasonable amount of variety is permitted for a diverse streetscape. Standards for this prototype (Table 3.3) include:

- **Form:** The building shall be composed of simple and compound massing of rectilinear forms. Its placement and hierarchical function shall dictate its level of importance, and whether it assumes a symmetrical or asymmetrical arrangement of those forms. The sloped roof shall be symmetrical gabled or hipped. A flat roof with a parapet wall is permitted, if it adequately complements other buildings.
- **Elevation:** The height shall be proportional to surrounding buildings, with a maximum of four stories allowed, unless otherwise specified by the regulating plan. Walls will have a constructional logic (of well-detailed brick and masonry work) that expresses a clear tripartite division of base, middle wall, and entablature. Setbacks may occur to reduce the appearance of the height. The first floor may also be set back to form a covered arcade or loggia. The main facade shall address the most prominent street or open space.
- **Windows:** Openings will be vertically proportioned or square and complement the style of the building and adjacent structures. Openings shall be horizontally and vertically disposed to adhere to the constructional logic of the walls, and may be grouped or evenly spaced. Materials may be aluminum-clad wood, extruded aluminum, or hollow steel frame. Glass can be either clear or lightly tinted, but not reflective. Windows shall be fixed, single-hung, or double-hung.
- **Storefronts:** Openings shall be vertically disposed to adhere to the constructional logic of the walls. Single panes of glass cannot exceed six feet in height and four feet in width. A minimum of 60 percent of the window pane surface area shall allow views into the ground floor. Storefronts may extend up to 12 inches beyond the primary facade.
- **Doors:** Openings shall be clearly defined, with vertical or square proportions that match the style of the building. Multiple ground-floor mission partner entries shall be equally expressed, and the primary building entrance shall be emphasized above all others. Materials shall be steel or extruded aluminum, and hinged. Doors may include glass panes in similar materials and configurations to complement the windows. Entrances may be coupled together and spaced a minimum 40 feet apart.

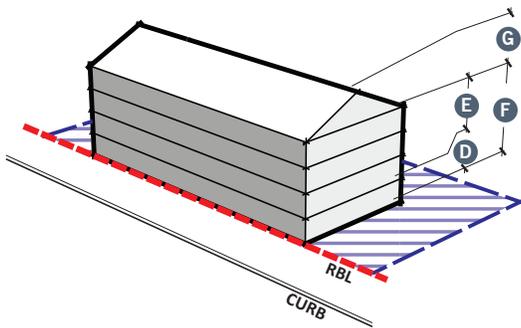
Table 3.3: Mixed-Use Buildings

PLAN



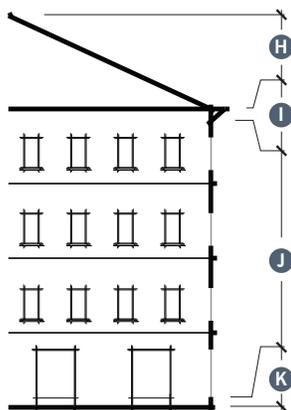
Placement	Dimension	
A Standoff from:	other buildings	36' min.
	ancillary structures	36' min.
	open spaces	0'- 30'
	parking	36' min.
B Building facade on RBL	> 25% min. of circumference	
C Building depth	90' min.	

ELEVATION



Level	Use/Type	Dimension
D Ground floor	Community	10'-15'
E Upper floors	Administration/Residential	10'-12'
F Maximum floors		Refer to Regulating Plan in Chapter 2
G Roof	Gable or Hip (5"/12" min. pitch), Parapet, or Flat	

SECTION



Component	Specifications
H Roof	Slope of flat form permitted - One building material/color: 100% coverage
I Wall entablature	Permitted - One building material/color: 100% coverage
J Wall facade	Primary Building Material/Color: 75%-100% coverage
	Secondary Building Material/Color: 0-25% coverage
K Wall base	Permitted - One building material/color: 100% coverage



DOL Supply Warehouses



Maintenance Depot



Davison Army Airfield



Lewis Stone Hangar at Davison Army Airfield

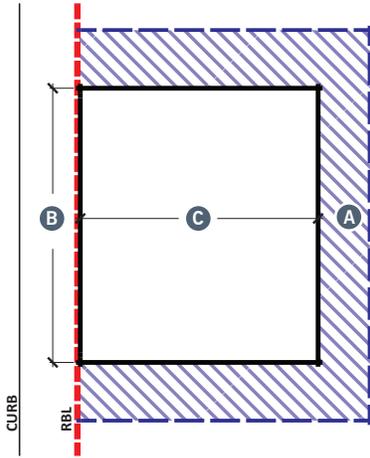
Warehouse/Flex-Space

This building prototype is intended principally for the Industrial and the DAAF Districts, where warehouses and hangars are employed for industrial, storage, and operational functions. The buildings will have a utilitarian appearance that is based on functional form with minimal articulation of the facade. Interior uses principally occupy one floor, but a second story may be incorporated into the building envelope to accommodate ancillary functions. The exterior detailing will complement the architectural styles of adjacent buildings to promote a unified visual character. However, a reasonable amount of variety is permitted when function dictates design variations. Standards for this prototype (Table 3.4) include:

- **Form:** The building shall be expressed with simple rectilinear forms. Ancillary forms may be attached or employed to link larger forms together. Its massing will be dictated by function, rather than any level of importance or relation to other like structures. Roofs may have to span large distances and can assume a variety of sloped forms that express their structural integrity and form. A flat roof with a parapet wall is permitted.
- **Elevation:** The maximum height shall be 30 feet, unless functionality necessitates greater height. Walls will have a constructional logic, to express a metal-clad structure or masonry. Wherever feasible the design of the buildings shall incorporate tripartite divisions of base, middle wall, and entablature. Vertical articulation may employ repeated bays that can aid in the disposition of large openings and doors.
- **Windows:** Wall openings are optional. When employed, these may assume a variety of configurations, either horizontally (such as clerestories or roof monitors) or vertically proportioned. Where glass expanses are desirable for natural/inside light, clerestories shall be incorporated on the appropriate sides of the building (east or south walls) to reduce heat gains during summer months. Openings will be disposed to adhere to the constructional logic of the walls, and may be grouped or evenly spaced. Materials may be extruded aluminum or hollow steel frame. Glass can be either clear, lightly tinted, or opaque, but not reflective. Windows shall be fixed or operational.
- **Doors:** Openings shall be proportioned according to their function. For pedestrian doors, the opening shall be expressed to clearly denote the point of entry. Materials shall be steel or extruded aluminum, and hinged. Doors may include glass panes.

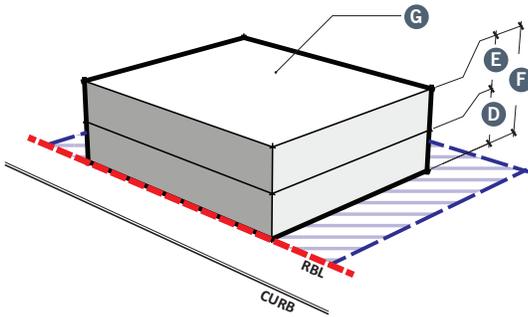
Table 3.4: Warehouse/Flex-Space Buildings

PLAN



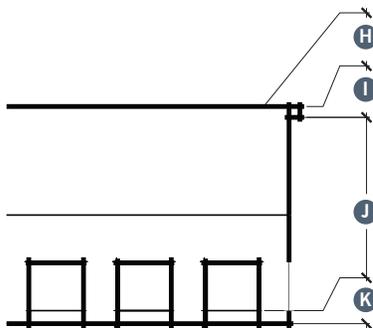
Placement	Dimension	
A Standoff from:	other buildings	36' min.
	ancillary structures	36' min.
	open spaces	0' min.
	parking	36' min.
B Building facade on RBL	> 25% min. of circumference	
C Building depth	No max.	

ELEVATION



Level	Use/Type	Dimension
D Ground floor	Industrial	20'-30'
E Upper floors	Industrial	20'-30'
F Maximum floors		Refer to Regulating Plan in Chapter 2
G Roof	Flat, Gable (5"/12" min. pitch)	

SECTION



Component	Specifications
H Roof	Flat form permitted - One building material/color: 100% coverage
I Wall entablature	Permitted - One building material/color: 100% coverage
J Wall facade	Primary Building Material/Color: 50% coverage
	Secondary Building Material/Color: 50% coverage
K Wall base	Permitted - One building material/color: 100% coverage

Soldier Housing

This building prototype is intended for residential housing of troops or Unaccompanied Personnel Housing (UPH), where it serves as part of a village ensemble of structures. Buildings shall be sited in campus-like arrangements that define outdoor spaces into quadrangles, malls, and courtyards. The Barracks shall be designed according to Army standards for UPH facilities. The external architectural materials shall reflect the general character of the Installation, and all buildings shall be uniform in appearance to avoid hierarchical dominance of any one building. Standards for this prototype (Table 3.5) include:



Warrior Transition Complex



McRee Barracks

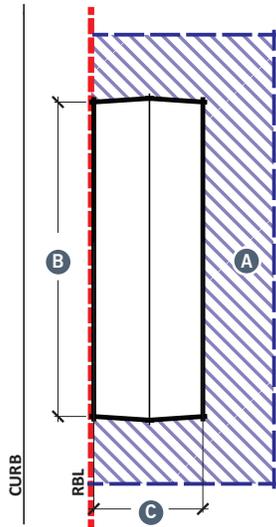


McRee Barracks

- **Form:** The building shall be composed of simple rectilinear forms. Two forms may be joined together in an “L” configuration, if the objective is to frame exterior space. The sloped roof shall be symmetrical gabled or hipped. A flat roof is not permitted.
- **Elevation:** The height shall be proportional to adjacent barracks, with a maximum of four stories allowed. Walls will have a constructional logic (of well-detailed brick and masonry work) that expresses a clear tripartite division of base, middle wall, and entablature. The main facade shall address the most prominent street or open space.
- **Windows:** Openings will be vertically proportioned or square and complement adjacent structures. Openings shall be horizontally and vertically disposed to adhere to the constructional logic of the walls, and align with interior functions. Materials may be aluminum-clad wood, extruded aluminum, or hollow steel frame. Glass can either be clear or lightly tinted, but not reflective. Windows shall be single-hung or double-hung.
- **Doors:** Openings will be clearly defined, with vertical or square proportions that match the style of the building. The primary entry will be emphasized to conform to the hierarchical order of ingress. Placement on the main facade shall be at the center of the building, unless an asymmetrical massing is employed. Materials shall be steel or extruded aluminum, and hinged. Doors may include glass panes in similar materials and configurations to complement the windows.

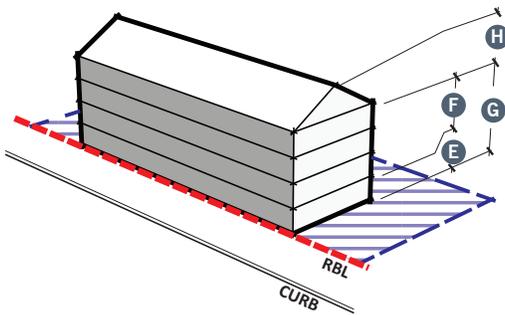
Table 3.5: Soldier Housing Buildings

PLAN



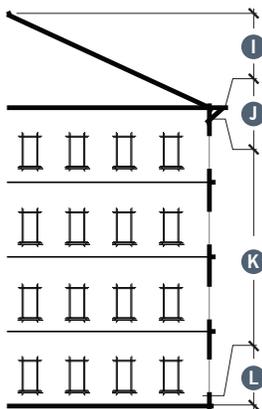
Placement	Dimension	
A Standoff from:	other buildings	36' min.
	ancillary structures	36' min.
	open spaces	0' min.
	parking	36' min.
B Building facade on RBL	> 25% min. of circumference	
C Building depth	50' max.	

ELEVATION



Level	Use/Type	Dimension
E Ground floor	Troop	10'
F Upper floors	Troop	10'
G Maximum floors		Refer to Regulating Plan in Chapter 2
H Roof	Flat or Gable (5"/12" min. pitch)	

SECTION



Component	Specifications
I Roof	Slope or flat form permitted - One building material/color: 100% coverage
J Wall entablature	Permitted - One building material/color: 100% coverage
K Wall facade	Primary Building Material/Color: 75-100% coverage
	Secondary Building Material/Color: 0-25% coverage
L Wall base	Permitted - One building material/color: 100% coverage



DLA Parking Garage



USALSA Parking Garage



Fort Belvoir Community Hospital Parking Garage



NGA Parking Garage

Parking Garage/Deck

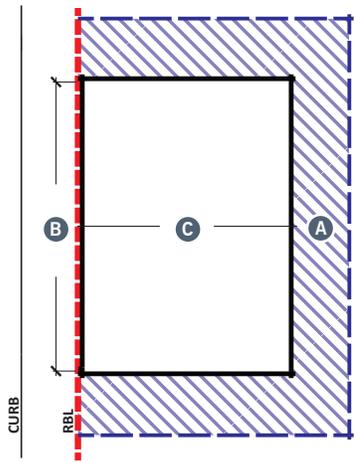
This building prototype is intended as an alternative to surface parking. It is primarily intended as a means to consolidate expansive surface lots in urban areas, or where large facilities will lead to excessive impervious paving coverage. The exterior materials and color will match those of adjacent buildings as much as possible. This IPS makes a distinction between garages and decks with regard to internal circulation. Garages incorporate internal ramps for vehicular access between floors; a deck does not. Decks are intended to be built into slopes, where the grade change allows external vehicular access to each level of parking. Garages may also be partially built below grade or into slopes to minimize their visual impact. Decks may also provide reduced cost benefits that will make their implementation more feasible than garages.

Garages shall be located off primary streets and intersections, and placed at the rear of facilities wherever possible. Design large garages (over 200 feet in length) to breakup the runs/offsets to help reduce the visual impacts of such structures. Standards for this prototype (Table 3.6) include:

- **Form:** The building shall be composed of simple rectilinear forms. Elevator and stair towers may be incorporated into the garage form, or attached as an ancillary form. A parapet wall is required on the top floor to conceal parked cars. Consider integrating exterior planters along the wall areas for visual aesthetics in selected area (e.g., the Historic Core District).
- **Elevation:** The height shall not exceed the height of any adjacent building. Walls will have a constructional logic (of well-detailed brick and masonry work) that expresses a clear tripartite division of base, middle wall, and entablature. Facades shall address the most prominent street and contribute to the road frontage in a manner proportionate to other buildings along the street. Commercial/boutique retail can be located on the ground level, fronting the road for additional community services. The commercial retail can only cover 25 percent maximum of the ground level footprint.
- **Windows** (for stair towers only): Openings shall be vertically proportioned or square and complement the style of adjacent structures. Openings shall be horizontally and vertically disposed to adhere to the constructional logic of the walls, and may be grouped or evenly spaced. Materials may be extruded aluminum or hollow steel frame. Glass can be either clear or lightly tinted. Windows shall be fixed.
- **Doors** (for stair towers only): Openings shall be clearly defined, with vertical or square proportions that match the style of the building. Entrances shall be emphasized to assist with orientation and directional of ingress. Materials shall be steel or extruded aluminum, and hinged. Doors may include glass panes in similar materials and configurations to complement the windows.

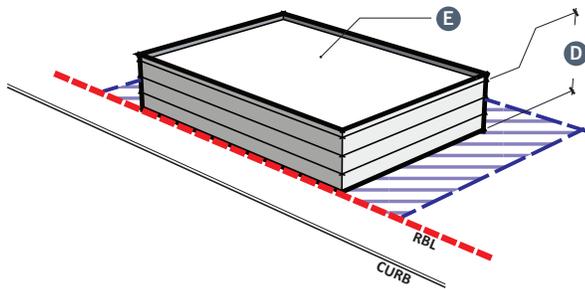
Table 3.6: Parking Garage/Deck

PLAN



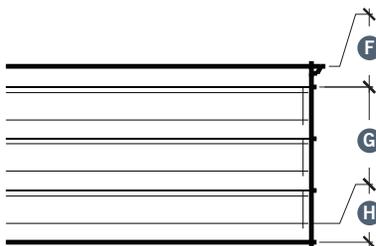
Placement	Dimension	
A Standoff from:	other buildings	36' min.
	ancillary structures	No minimum
	open spaces	No minimum
	parking	No minimum
B Building facade on RBL	No maximum	
C Building depth	120' min.	

ELEVATION



Level	Use/Type	Dimension
D Floors	Parking/Applicable Land Use	10'
E Roof	Parapet, Canopies permitted	

SECTION



Component	Specifications
F Wall entablature	Permitted: Match adjacent building and coverage
G Wall facade	Primary Building Material/Color: Match adjacent building and coverage
	Secondary Building Material/Color: Match adjacent building and coverage
H Wall base	Permitted: Match adjacent building and coverage



Fort Belvoir Officers' Club



Van Noy Library



Fort Belvoir Chapel

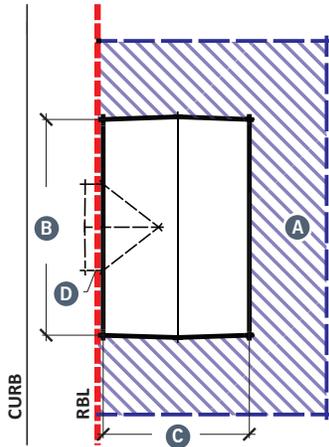
Civic Buildings

This building prototype is intended for public functions of a congregational nature. Examples include religious centers, libraries, schools, community centers, recreation buildings, and clubhouses. In urban areas, this prototype is meant to function as part of an ensemble of buildings that contributes to the street frontage. However, given the public nature of the structure, its architectural design can assume some prominence among neighboring buildings and act as a landmark. Regardless of its visual importance, the exterior detailing will complement the architectural styles of adjacent buildings to promote a unified visual character. Standards for this prototype include:

- **Form:** The building shall be composed of simple and compound massing of rectilinear forms. Its placement and hierarchical function shall dictate its level of importance, and whether it assumes a symmetrical or asymmetrical arrangement of those forms. The sloped roof shall be symmetrical gabled or hipped. A flat roof with a parapet wall is permitted if it adequately complements other buildings.
- **Elevation:** The height shall be proportional to surrounding buildings. Walls will have a constructional logic (of well-detailed brick and masonry work) that expresses a clear tripartite division of base, middle wall, and entablature. The main facade shall address the most prominent street or open space.
- **Windows:** Openings shall be vertically proportioned or square and complement the style of the building and adjacent structures. Openings shall be horizontally and vertically disposed to adhere to the constructional logic of the walls, and may be grouped or evenly spaced. Materials may be wood, aluminum-clad wood, extruded aluminum, or hollow steel frame. Glass can be either clear or lightly tinted. Windows shall be fixed, single-hung, or double-hung. Glass is permitted, but not reflective in nature. Stained glass is permitted in religious centers.
- **Doors:** Openings shall be clearly defined, with vertical or square proportions that match the style of the building. The primary entry will be emphasized to conform to the hierarchical order of ingress. Placement on the main facade shall be at the center of the building, unless an asymmetrical massing is employed. Materials shall be wood, steel, or extruded aluminum, and hinged. Doors may include glass panes in similar materials and configurations to complement the windows.

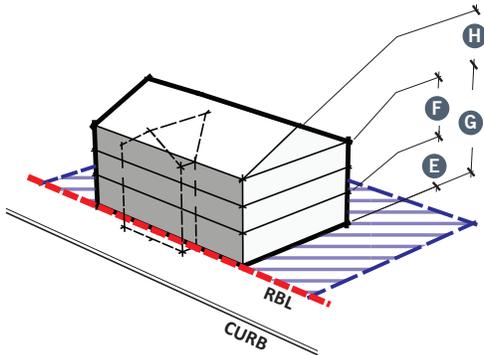
Table 3.7: Civic Buildings

PLAN



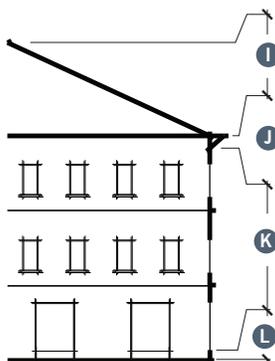
Placement	Dimension	
A Standoff from:	other buildings	36' min.
	ancillary structures	36' min.
	open spaces	0' min.
	parking	36' min.
B Building facade on RBL	> 25% min. of circumference	
C Building depth	No maximum	
D Portico depth	25' max.	

ELEVATION

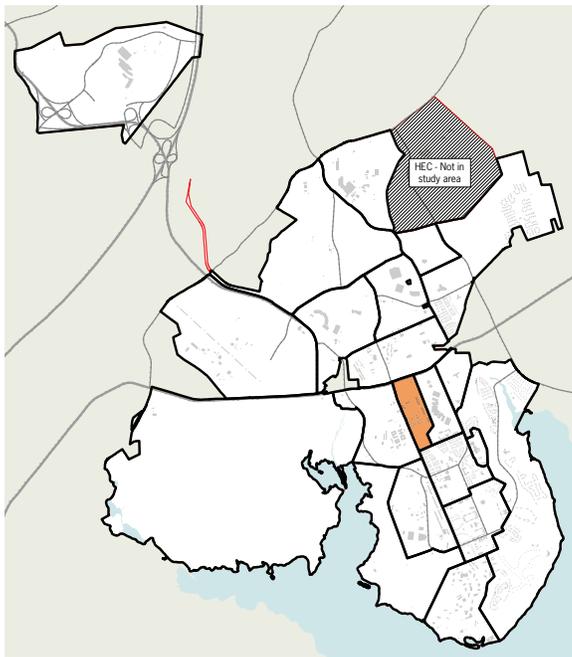


Level	Use/Type	Dimension
E Ground floor	Community	No maximum
F Upper floors	Community	10'-15'
G Maximum floors		Refer to the Regulating Plan
H Roof	Flat, Gable (5"/12" min. pitch), Steeples, or other projections permitted	

SECTION



Component	Specifications
I Roof	Slope or flat form permitted - One building material/color: 100% coverage
J Wall entablature	Permitted - One building material/color: 100% coverage
K Wall facade	Primary Building Material/Color: 75-100% coverage
	Secondary Building Material/Color: 25-100% coverage
L Wall base	Permitted - One building material/color: 100% coverage



1400 Area East District Key Map



USALSA Facility



USALSA Parking Structure

Colors and Materials

This section is a list of appropriate materials and colors for exterior facade applications appropriate for each district. The palette of materials and colors creates a uniform appearance within the district, so that buildings maintain the overall character of Fort Belvoir. Not all districts or large facility complexes within districts have colors and materials palettes provided because they are either iconic in style and have their own unique palettes, or are under a lease agreement, which stipulates appearance standards. If future development occurs within these districts, or expansion on existing facilities is proposed, then the existing or adjacent structures' colors and materials shall be matched. These districts/facilities include:

- Intelligence District
- DLA/INSCOM District
- FBNA District
- Southwest District
- North Residential District
- Community Activities District
- NMUSA
- FBCH Complex

1400 Area East District

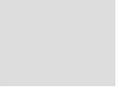
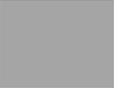
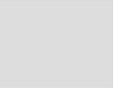
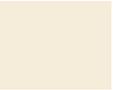
The Vision and Development Plan of the Real Property Master Plan proposes to redevelop the 1400 Area East District into a higher density employment hub focusing on administrative office functions. Integrated into the site will be parking structures to accommodate employees as well as green common space for courtyards, employee break areas, and stormwater management.

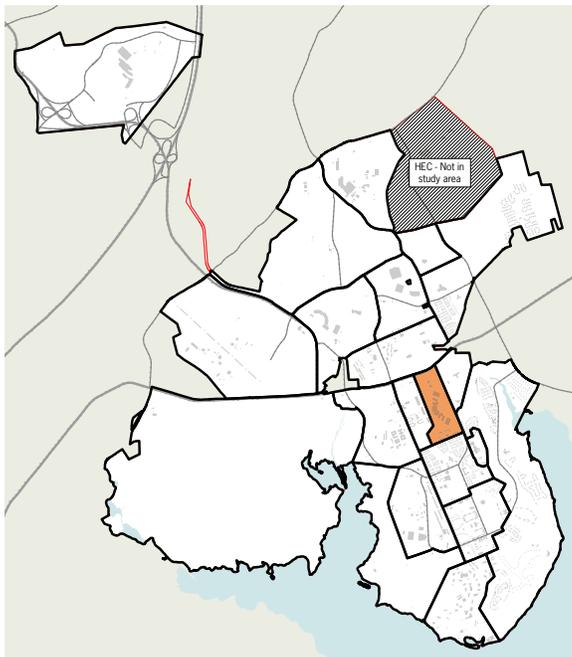
Visually, the district is envisioned as a modern office park. The recent construction of the USALSA facility set the precedent architectural style of contemporary/modern architecture. Future buildings within the district shall follow suit by matching the form, scaling, facade treatment, materials and colors set by USALSA. Buildings shall be three- to five- stories in height and rectilinear in massing. Facades shall be articulated to break up the large scale of the facilities and give architectural interest to the buildings. Roofs shall be flat with parapets to hide mechanical equipment. Main entrances shall be emphasized to give importance to the facility and clearly direct pedestrians. Exterior detailing may include pronounced fascias, molding, window and door dressings, and stone base.

Exterior building materials may include (Table 3.8):

- Red brick or stone base with brick facade and brick, stone, or painted wood trim and facade articulation,
- Gravel ballast or membrane system on flat roofs with parapets,
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors preferably include glass panes.

Table 3.8: 1400 Area East District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>						
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Stone/Concrete Natural/Beige</p>	 <p>W3-Painted Red Brick (Pantone 467 C)</p>	 <p>W4-Painted Tan (Pantone 467 C)</p>	 <p>W5-Painted Light Gray (Pantone 420 C)</p>	 <p>W6-Painted Cream (Pantone 9140 C)</p>	 <p>W7-Painted White (Pantone 9063 C)</p>	
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Painted Tan (Pantone 467 C)</p>	 <p>E2-Painted Light Gray (Pantone 420 C)</p>	 <p>E3-Painted Cream (Pantone 9140 C)</p>	 <p>E4-Painted White (Pantone 9063 C)</p>			
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>	 <p>B2-Stone/Concrete Natural/Beige</p>					
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Gravel Ballast Gray Mix</p>	 <p>R2-Membrane/Metal Gray (Pantone 877 C)</p>	 <p>R3-Membrane/Metal Light Gray (Pantone 420 C)</p>	 <p>R4-Membrane White (Pantone 9063 C)</p>			
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>	 <p>F2-Glass Light Gray Tint</p>	 <p>F3-Painted Gray (Pantone 877 C)</p>	 <p>F4-Painted Tan (Pantone 467 C)</p>	 <p>F5-Painted Light Gray (Pantone 420 C)</p>	 <p>F6-Painted Cream (Pantone 9140 C)</p>	 <p>F7-Painted White (Pantone 9063 C)</p>
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Stone/Concrete Natural/Beige</p>	 <p>T2-Painted Gray (Pantone 877 C)</p>	 <p>T3-Painted Tan (Pantone 467 C)</p>	 <p>T4-Painted Light Gray (Pantone 420 C)</p>	 <p>T5-Painted Cream (Pantone 9140 C)</p>	 <p>T6-Painted White (Pantone 9063 C)</p>	
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Gray (Pantone 877 C)</p>	 <p>A2-Painted Tan (Pantone 467 C)</p>	 <p>A3-Painted Light Gray (Pantone 420 C)</p>	 <p>A4-Painted Cream (Pantone 9140 C)</p>	 <p>A5-Painted White (Pantone 9063 C)</p>		
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>	 <p>S2-Stone/Concrete Natural/Beige</p>	 <p>S3-Painted Gray (Pantone 877 C)</p>	 <p>S4-Painted Tan (Pantone 467 C)</p>			



Medical District Key Map

Medical District

The Medical District on Fort Belvoir encompasses relatively new development with the FBCH, NRMC, dental clinics, Warrior Transition Complex, and USO Warrior and Family Center. These facilities provide care for our nation's returning service men and women as they cope and recover from injuries incurred in battle, and medical services for military and retirees in the NCR.

The visual character of the district is divided as FBCH, NRMC, and the dental clinics are iconic in architectural design, and the Warrior Transition Complex and USO Center are transitional architecture, combining traditional and contemporary styles. While the visual language of Fort Belvoir is historically and predominantly red brick, FBCH, NRMC and the dental clinics are composed of materials with a more modern interpretation: terra cotta tiles, strip and punched windows, metal wall panel surfaces and sloping roof forms. Future development associated with or adjacent to these facilities shall match the architectural style, detailing, and materials and colors of the existing facility to create a cohesive visual canvas. Because these facilities are iconic in style, materials and colors are not specified here.



Warrior Transition Complex

The Warrior Transition Complex and the USO Center share the same design characteristics with single- to four-story buildings, compound rectilinear forms, undulating facades, and gabled roofs. Exterior detailing includes substantial cornices, molding, window and door dressings, facade articulations, and awnings at entrances. Development adjacent to these facilities shall match the transitional style of the buildings as well as the exterior building materials and colors (Table 3.9).

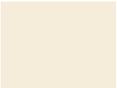
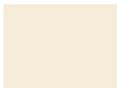
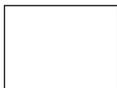


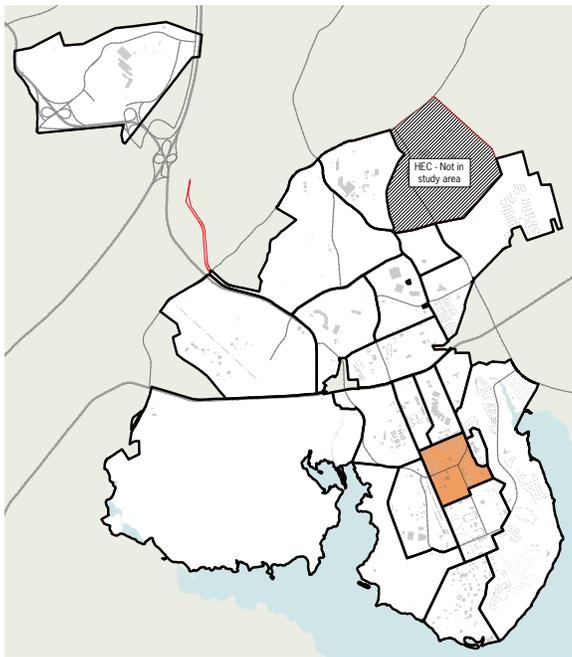
Fort Belvoir Community Hospital

Exterior building materials for the Warrior Transition Complex and USO Center may include:

- Red brick base with tan brick upper level,
- Brick, stone, or painted wood trim and facade articulation,
- Standing seam metal roofs,
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors preferably include glass panes.

Table 3.9: Medical District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>							
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>							
<p><i>Wall Entablature:</i> Materials and Colors</p>							
<p><i>Wall Base:</i> Materials and Colors</p>							
<p><i>Roof:</i> Materials and Colors</p>							
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>							
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>							
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>							
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>							



Town Center District Key Map

Town Center District

The Town Center District is a mixture of administrative, civic, residential, recreation and retail buildings that form Fort Belvoir's "Downtown." The mixed-use district combines housing and retail with a well-crafted and articulated streetscape design to create a "Main Street" area and an identifiable central destination for residents and employees, and supplements the existing community services in the district. This dense urban area incorporates traditional planning and architectural design sympathetic to the precedent of South Post.

The architectural style of the Town Center District is a combination of traditional Neoclassical, Colonial Revival, and Federal-style architecture that blends with the context of the historic district to the south. Facilities range from single-story buildings to four-story buildings, and are simple rectilinear forms with either gabled roofs or flat roofs with parapets. Exterior detailing includes substantial cornices, molding, window and door dressings, facade articulations, and awnings or canopies where appropriate.

Exterior building materials may include (Table 3.10):

- Red brick with brick, stone, or painted wood trim and facade articulation,
- Standing seam metal or asphalt shingles of gabled roofs, or a gravel ballast or membrane system on flat roofs with parapets,
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors preferably include glass panes.



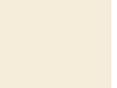
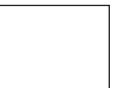
Fort Belvoir Town Center

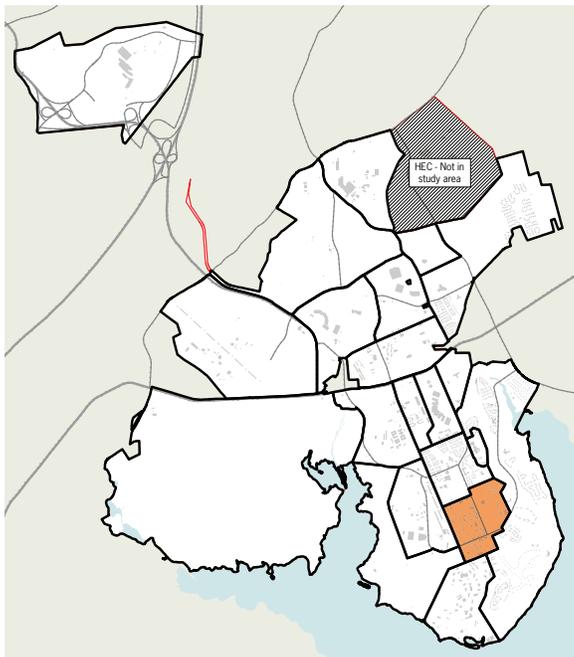
Vernondale Village, Herryford Village and Cedar Grove Village are residential developments located within the Town Center District. These housing areas include three-, four-, and five-bedroom attached townhomes and single-family homes constructed in the Colonial Revival style. Garages are either attached to the house with a driveway or located behind an access road. The homes are simple rectilinear forms with gabled roofs, dormer windows, and architectural details to create interest. Exterior details may include shutters, window and door cornices, pediments, and front porches or canopies. Exterior materials may include red brick or vinyl siding, slate roofs, and painted wood trim or moldings.



Town Center District

Table 3.10: Town Center District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>					
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>					
<p><i>Wall Entablature:</i> Materials and Colors</p>					
<p><i>Wall Base:</i> Materials and Colors</p>					
<p><i>Roof:</i> Materials and Colors</p>					
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>					
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>					
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>					
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>					
					



Historic Core District Key Map

Historic Core District

The Historic Core District delineates the oldest developed area on Fort Belvoir. Buildings are sited according to an original master plan that dictated bilateral symmetry to create a formal presence. The orthogonal arrangement of buildings creates interior courtyards and frames open spaces resulting in a more pedestrian-oriented environment. The arrangement also dictates appropriate and rational locations for future development.

The overall architectural style is traditional Colonial Revival. Buildings are similar in massing, rectilinear in form with gabled roof lines in slate, and rendered in red brick, limestone, and wood trim, which lends to a unified appearance. Architectural detailing and ornamentation on buildings provide visual interest, adding to the streetscape and pedestrian experience in the district.

Exterior building materials may include (Table 3.11):

- Red brick with a stone base and/or brick, stone, or painted wood trim. The red brick will have to be selected to match existing buildings to blend with the historic district.
- Slate or asphalt shingles of gabled roofs, or a gravel ballast or membrane system on flat roofs with parapets,
- Metal or wood frames may be used for door and window frames. Doors shall be wood or metal with paneling and may include glass panes.

Gerber Village is comprised of single-family homes and six duplexes located within the district. The simple rectilinear homes with gabled roofs and accentuated entrances blend with the context of the district. The Colonial Revival style houses are constructed from common bond brick and feature wood trim and slate roofs.



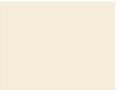
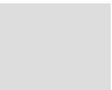
Gerber Village

Additional guidance on the treatment of historic properties within the Historic Core District can be found in Appendix B - Historic Preservation. This section provides more detailed guidance on historic resource issues.

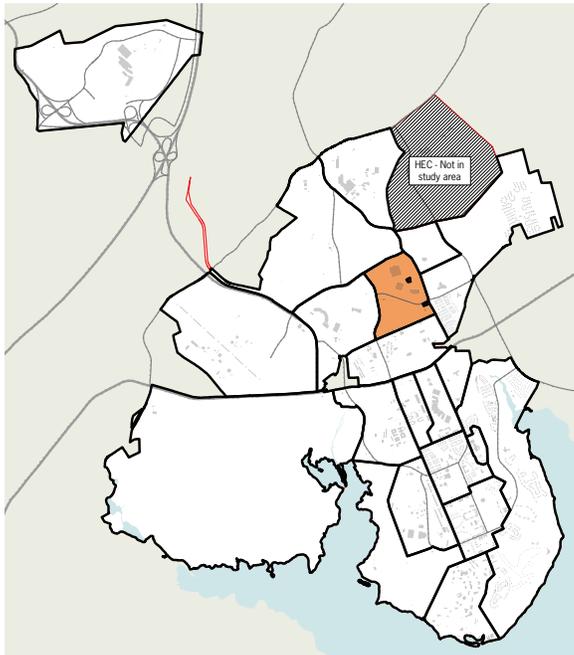


Fort Belvoir Garrison Headquarters

Table 3.11: Historic Core District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>					
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Stone/Concrete Natural/Beige</p>	 <p>W3-Painted Red Brick (Pantone 7524 C)</p>	 <p>W4-Painted Tan (Pantone 467 C)</p>	 <p>W5-Painted Cream (Pantone 9140 C)</p>	 <p>W6-Painted White (Pantone 9063 C)</p>	
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Painted Natural/Beige</p>	 <p>E2-Painted Tan (Pantone 467 C)</p>	 <p>E3-Painted Cream (Pantone 9140 C)</p>	 <p>E4-Painted White (Pantone 9063 C)</p>		
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>	 <p>B2-Stone/Concrete Natural/Beige</p>				
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Buckingham Slate Dark Gray</p>	 <p>R2-Shingles Dark Gray</p>	 <p>R3-Gravel Ballast Gray Mix</p>	 <p>R4-Membrane/Metal Gray (Pantone 877 C)</p>	 <p>R5-Membrane/Metal Light Gray (Pantone 420 C)</p>	 <p>R6-Membrane White (Pantone 9063 C)</p>
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>	 <p>F2-Painted Tan (Pantone 467 C)</p>	 <p>F3-Painted Cream (Pantone 9140 C)</p>	 <p>F4-Painted White (Pantone 9063 C)</p>		
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Brick Red</p>	 <p>T2-Stone/Concrete Natural/Beige</p>	 <p>T3-Painted Cream (Pantone 9140 C)</p>	 <p>T4-Painted White (Pantone 9063 C)</p>		
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Dark Brown (Pantone 411 C)</p>	 <p>A2-Painted/Fabric Dark Green (Pantone 5615 C)</p>	 <p>A3-Metal Copper</p>			
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>	 <p>S2-Stone/Concrete Natural/Beige</p>	 <p>S3-Painted White (Pantone 9063 C)</p>	 <p>S4-Wood Treated/Natural</p>		

* All stone/concrete materials specified must be matched to existing materials within the Historic Core District.



North Post Community Support District Key Map

North Post Community Support District

The North Post Community Support District blends residential, retail, office, educational and recreational functions into a single support district that serves the region. The district features a pedestrian-centered promenade, which provides entry into the Commissary/Post Exchange center, that connects the different functions of the district and integrates them with vehicular circulation and parking to create a cohesive mixed use development.

The overall visual character of the district is traditional with contemporary details. The architecture is simple, straightforward, and contextual, presenting an image that is evocative of Fort Belvoir's historic core. The facilities are large and rectilinear in scale and form. To minimize their visual impact and integrate a human scale, the basic building massing is visually scaled down by the use of horizontal precast elements, brick accent bands and a linear canopy. The canopy areas use forms and simple shapes that are detailed to visually appear open. The brick masonry and precast elements are woven together, providing a cohesive presence. These same elements are used in the pedestrian promenade to unify the district.



Concept of the North Post Community Support District

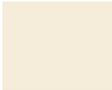
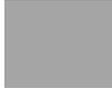
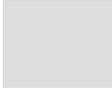
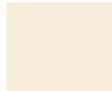
Exterior building materials may include (Table 3.12):

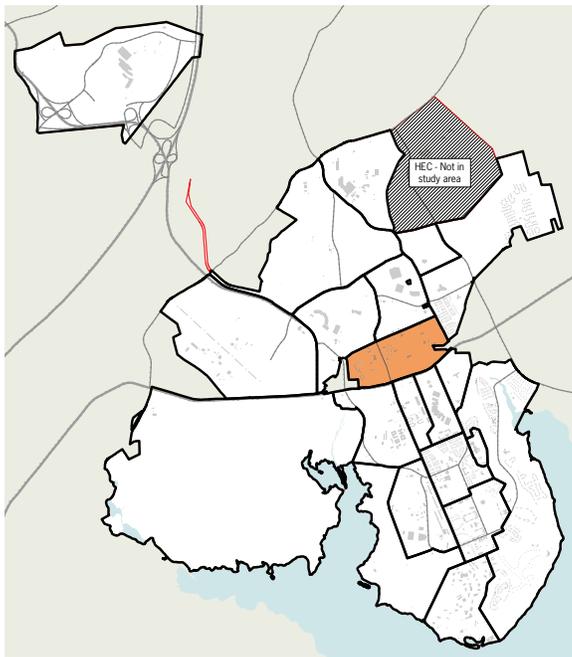
- Red brick or precast concrete panels with red brick veneer,
- Metal standing seam roof panels or membrane roof system, and
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors may include glass panes.



The Post Exchange establishes a palate of red brick for the North Post Community Support District.

Table 3.12: North Post Community Support District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>					
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Stone/Concrete Natural/Beige</p>	 <p>W3-Concrete Medium Gray</p>	 <p>W4-Painted Tan (Pantone 467 C)</p>	 <p>W5-Painted Light Gray (Pantone 420 C)</p>	 <p>W6-Painted Cream (Pantone 9140 C)</p>	 <p>W7-Painted White (Pantone 9063 C)</p>
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Painted Tan (Pantone 467 C)</p>	 <p>E2-Painted Cream (Pantone 9140 C)</p>	 <p>E3-Painted White (Pantone 9063 C)</p>			
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>	 <p>B2-Stone/Concrete Natural/Beige</p>				
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Gravel Ballast Gray Mix</p>	 <p>R2-Membrane/Metal Gray (Pantone 877 C)</p>	 <p>R3-Membrane/Metal Light Gray (Pantone 420 C)</p>	 <p>R4-Membrane White (Pantone 9063 C)</p>		
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>	 <p>F2-Glass Light Gray Tint</p>	 <p>F3-Painted Cream (Pantone 9140 C)</p>	 <p>F4-Painted White (Pantone 9063 C)</p>		
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Stone/Concrete Natural/Beige</p>	 <p>T2-Painted Tan (Pantone 467 C)</p>	 <p>T3-Painted Cream (Pantone 9140 C)</p>	 <p>T4-Painted White (Pantone 9063 C)</p>		
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Dark Brown (Pantone 411 C)</p>	 <p>A2-Painted Tan (Pantone 467 C)</p>	 <p>A3-Painted Cream (Pantone 9140 C)</p>	 <p>A4-Painted White (Pantone 9063 C)</p>		
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>	 <p>S2-Stone/Concrete Natural/Beige</p>	 <p>S3-Painted Tan (Pantone 467 C)</p>	 <p>S4-Painted Light Gray (Pantone 420 C)</p>	 <p>S5-Painted Cream (Pantone 9140 C)</p>	 <p>S6-Painted White (Pantone 9063 C)</p>



Lower North Post District Key Map

Lower North Post District

Architecturally, the Lower North Post District is divided into two areas by Gunston Road: the east and the west sections. The west section is currently characterized by Army Reserve buildings, motor pools, and warehouse facilities. In the long term, the west area will be maintained as an industrial area with modernized warehouse and storage facilities. Visually, these shall match the same utilitarian style and characteristics proposed for the Industrial District on South Post. The proposed large warehouses will be single-story in height, rectilinear in form, and have flat or sloping roofs. Exterior detailing will be minimal as well as window and door fenestrations. Building entrances will be emphasized with canopies and appropriate architectural treatments.

Exterior building materials for the east section may include:

- Brick and/or painted steel or aluminum metal siding,
- Metal standing seam roof panels or membrane roof system, and
- Metal frames may be used for door and window frames.

Refer to Table 3.13 for industrial materials and colors to be used in the Lower North Post east section.



OCAR Facility

Future development of the east section of the Lower North Post District shall match the recently constructed Office of the Chief, Army Reserve (OCAR) facility located along Goethals Road. The OCAR facility set the precedent and contemporary architectural style that shall be used for future construction. Buildings shall be larger scale, varying in height from two to four stories. The building's massing will be rectilinear in form with a flat roof and parapets to hide mechanical equipment. Facades shall be articulated to create interest and visually break up the massive scale of the facilities. Main entrances shall be emphasized to portray importance and direct visitors to the main lobby.



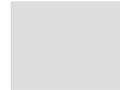
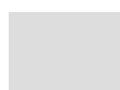
McRee Barracks

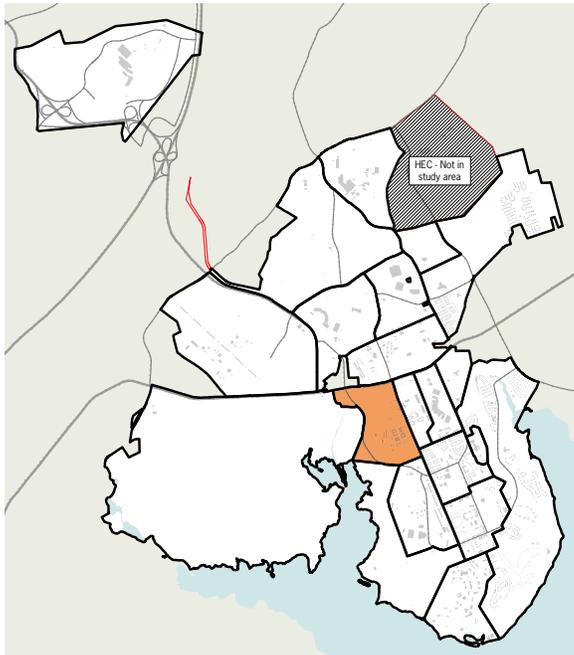
Exterior building materials may include (Table 3.13):

- Red brick or stone base with brick facade and brick, stone, or painted wood trim and facade articulation,
- Standing seam metal on gabled roofs, or gravel ballast or membrane system on flat roofs with parapets,
- Metal frames may be used for door and window frames. Doors preferably include glass panes.

Because of the Lower North Post District's adjacency to several regional historic sites, additional development and preservation restrictions apply. For further details refer to the Fort Belvoir VDP Cultural Resources section.

Table 3.13: Lower North Post District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>						
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Brick Tan</p>	 <p>W3-Stone/Concrete Natural/Beige</p>	 <p>W4-Painted Red Brick (Pantone 467 C)</p>	 <p>W5-Painted Tan (Pantone 467 C)</p>	 <p>W6-Painted Cream (Pantone 9140 C)</p>	 <p>W7-Painted White (Pantone 9063 C)</p>	
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Painted Tan (Pantone 467 C)</p>	 <p>E2-Painted Cream (Pantone 9140 C)</p>	 <p>E3-Painted White (Pantone 9063 C)</p>				
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>	 <p>B2-Brick Tan</p>	 <p>B3-Stone/Concrete Natural/Beige</p>				
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Gravel Ballast Gray Mix</p>	 <p>R2-Membrane/Metal Gray (Pantone 877 C)</p>	 <p>R3-Membrane/Metal Light Gray (Pantone 420 C)</p>	 <p>R4-Membrane White (Pantone 9063 C)</p>			
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>	 <p>F2-Glass Light Gray Tint</p>	 <p>F3-Painted Gray (Pantone 877 C)</p>	 <p>F4-Painted Tan (Pantone 467 C)</p>	 <p>F5-Painted Light Gray (Pantone 420 C)</p>	 <p>F6-Painted Cream (Pantone 9140 C)</p>	 <p>F7-Painted White (Pantone 9063 C)</p>
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Stone/Concrete Natural/Beige</p>	 <p>T2-Painted Gray (Pantone 877 C)</p>	 <p>T3-Painted Tan (Pantone 467 C)</p>	 <p>T4-Painted Light Gray (Pantone 420 C)</p>	 <p>T5-Painted Cream (Pantone 9140 C)</p>	 <p>T6-Painted White (Pantone 9063 C)</p>	
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Gray (Pantone 877 C)</p>	 <p>A2-Painted Tan (Pantone 467 C)</p>	 <p>A3-Painted Light Gray (Pantone 420 C)</p>	 <p>A4-Painted Cream (Pantone 9140 C)</p>	 <p>A5-Painted White (Pantone 9063 C)</p>		
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>	 <p>S2-Brick Tan</p>	 <p>S3-Stone/Concrete Natural/Beige</p>	 <p>S4-Painted Tan (Pantone 467 C)</p>			



1400 Area West District Key Map

1400 Area West District

In the long term, the 1400 Area West District is proposed to be redeveloped into an eight-story administrative office complex. The current industrial and warehouse facilities will be replaced with high density, single or multi-mission partner office buildings centered around open green space. Because of the proposed density, the proposed architectural type shall be iconic in form and style if one single large mission partner occupies the district. This will be similar to other iconic districts such as DLA/INCSOM and the FBNA. The district shall have its own palette of design materials and colors unique to the site. However, if several mission partners occupy the district, the facilities shall blend with the 1400 East District to be visually compatible. Table 3.14 summarizes the recommended building materials and colors that shall be used in the district to maintain visual continuity with Fort Belvoir.

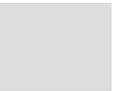
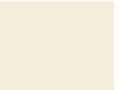
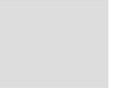


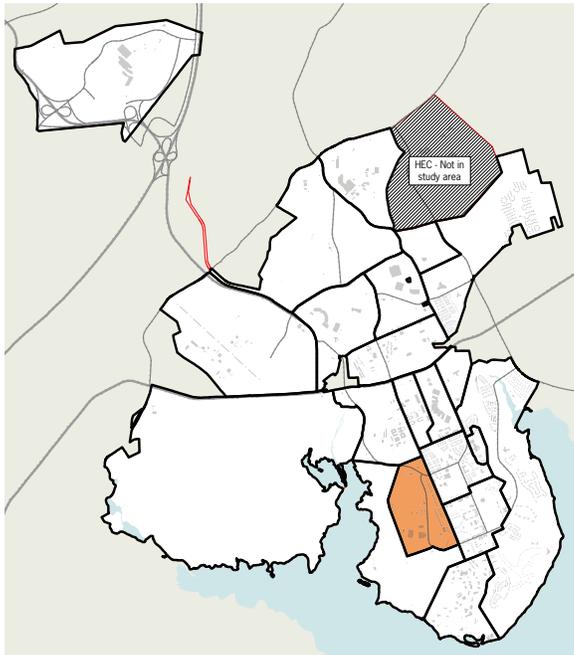
Example of administrative office architecture from USALSA in the 1400 East District



Building 1442 - Directorate of Public Works is to be retained with future development

Table 3.14: 1400 Area West District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>															
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Stone/Concrete Natural/Beige</p>		 <p>W3-Brick Tan</p>		 <p>W4-Painted Red Brick (Pantone 467 C)</p>		 <p>W5-Painted Tan (Pantone 467 C)</p>		 <p>W6-Painted Light Gray (Pantone 420 C)</p>		 <p>W7-Painted Cream (Pantone 9140 C)</p>		 <p>W8-Painted White (Pantone 9063 C)</p>			
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Painted Tan (Pantone 467 C)</p>		 <p>E2-Painted Light Gray (Pantone 420 C)</p>		 <p>E3-Painted Cream (Pantone 9140 C)</p>		 <p>E4-Painted White (Pantone 9063 C)</p>									
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>		 <p>B2-Stone/Concrete Natural/Beige</p>													
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Shingles Dark Gray</p>		 <p>R2-Gravel Ballast Gray Mix</p>		 <p>R3-Membrane/Metal Gray (Pantone 877 C)</p>		 <p>R4-Membrane/Metal Light Gray (Pantone 420 C)</p>		 <p>R5-Membrane White (Pantone 9063 C)</p>							
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>		 <p>F2-Glass Light Gray Tint</p>		 <p>F3-Painted Dark Brown (Pantone 411 C)</p>		 <p>F4-Painted Gray (Pantone 877 C)</p>		 <p>F5-Painted Tan (Pantone 467 C)</p>		 <p>F6-Painted Light Gray (Pantone 420 C)</p>		 <p>F7-Painted Cream (Pantone 9140 C)</p>		 <p>F8-Painted White (Pantone 9063 C)</p>	
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Stone/Concrete Natural/Beige</p>		 <p>T2-Painted Gray (Pantone 877 C)</p>		 <p>T3-Painted Tan (Pantone 467 C)</p>		 <p>T4-Painted Light Gray (Pantone 420 C)</p>		 <p>T5-Painted Cream (Pantone 9140 C)</p>		 <p>T6-Painted White (Pantone 9063 C)</p>					
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Gray (Pantone 877 C)</p>		 <p>A2-Painted Tan (Pantone 467 C)</p>		 <p>A3-Painted Light Gray (Pantone 420 C)</p>		 <p>A4-Painted Cream (Pantone 9140 C)</p>		 <p>A5-Painted White (Pantone 9063 C)</p>							
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>		 <p>S2-Stone/Concrete Natural/Beige</p>		 <p>S3-Painted Gray (Pantone 877 C)</p>		 <p>S4-Painted Tan (Pantone 467 C)</p>									



Industrial Area District Key Map

Industrial Area District

The Industrial Area District is typified by warehouses, single-story administrative offices, storage lots, motor pools, and service yards. The regulating plan proposes to redevelop this area into a more efficient warehouse and storage area. Modern facilities will offer a level of acceptable design aesthetic that fulfills required standards for industrial uses.

The architectural character of the district is utilitarian in appearance and function. Large warehouses are single-story in height, rectilinear in form, and have flat or sloping roofs. Exterior detailing is minimal as well as window and door fenestrations. Building entrances are emphasized with canopies and appropriate architectural treatments.

Exterior building materials may include (Table 3.15):

- Brick and/or painted steel or aluminum metal siding,
- Metal standing seam roof panels or membrane roof system, and
- Extruded aluminum or hollow steel frames may be used for door and window frames.

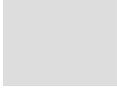
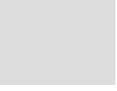
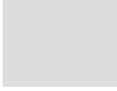
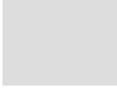


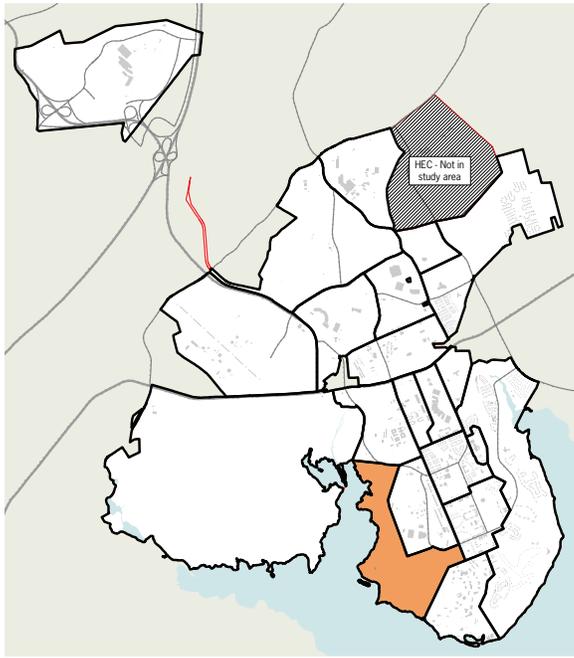
National Museum of the U.S. Army Support Center



DOL Supply Support Division Warehouse

Table 3.15: Industrial District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>															
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Metal Tan (Pantone 467 C)</p>		 <p>W3-Metal Cream (Pantone 9140 C)</p>		 <p>W4-Painted Red Brick (Pantone 467 C)</p>		 <p>W5-Painted Tan (Pantone 467 C)</p>		 <p>W6-Painted Cream (Pantone 9140 C)</p>		 <p>W7-Painted White (Pantone 9063 C)</p>					
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Painted Dark Green (Pantone 5615 C)</p>		 <p>E2-Painted Gray (Pantone 877 C)</p>		 <p>E3-Painted Tan (Pantone 467 C)</p>		 <p>E4-Painted Light Gray (Pantone 420 C)</p>		 <p>E5-Painted Cream (Pantone 9140 C)</p>		 <p>E6-Painted White (Pantone 9063 C)</p>					
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>		 <p>B2-Stone/Concrete Natural/Beige</p>		 <p>B3-Painted Tan (Pantone 467 C)</p>		 <p>B4-Painted Cream (Pantone 9140 C)</p>									
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Gravel Ballast Gray Mix</p>		 <p>R2-Stone/Concrete Dark Green (Pantone 5615 C)</p>		 <p>R3-Membrane/Metal Gray (Pantone 877 C)</p>		 <p>R4-Membrane/Metal Light Gray (Pantone 420 C)</p>		 <p>R5-Membrane White (Pantone 9063 C)</p>							
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>		 <p>F2-Glass Light Gray Tint</p>		 <p>F3-Painted Dark Brown (Pantone 411 C)</p>		 <p>F4-Painted Gray (Pantone 877 C)</p>		 <p>F5-Painted Tan (Pantone 467 C)</p>		 <p>F6-Painted Light Gray (Pantone 420 C)</p>		 <p>F7-Painted Cream (Pantone 9140 C)</p>		 <p>F8-Painted White (Pantone 9063 C)</p>	
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Brick Red</p>		 <p>T2-Stone/Concrete Natural/Beige</p>		 <p>T3-Painted Red Brick (Pantone 467 C)</p>		 <p>T4-Painted Dark Brown (Pantone 411 C)</p>		 <p>T5-Painted Dark Green (Pantone 5615 C)</p>		 <p>T6-Painted Tan (Pantone 467 C)</p>		 <p>T7-Painted Cream (Pantone 9140 C)</p>		 <p>T8-Painted White (Pantone 9063 C)</p>	
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Red Brick (Pantone 467 C)</p>		 <p>A2-Painted Dark Brown (Pantone 411 C)</p>		 <p>A3-Painted Dark Green (Pantone 5615 C)</p>		 <p>A4-Painted Gray (Pantone 877 C)</p>		 <p>A5-Painted Tan (Pantone 467 C)</p>		 <p>A6-Painted Light Gray (Pantone 420 C)</p>		 <p>A7-Painted Cream (Pantone 9140 C)</p>		 <p>A8-Painted White (Pantone 9063 C)</p>	
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>		 <p>S2-Stone/Concrete Natural/Beige</p>		 <p>S3-Painted Red Brick (Pantone 467 C)</p>		 <p>S4-Painted Tan (Pantone 467 C)</p>		 <p>S5-Painted Cream (Pantone 9140 C)</p>		 <p>S6-Painted White (Pantone 9063 C)</p>					



Recreation District Key Map

Recreation District

The Recreation District delineates areas used for active recreation such as Tompkins Basin and passive recreation such as the Accotink Wildlife Refuge. Planned recreation areas represent the more intense use of open space that satisfies the needs for public events and programs such as multipurpose fields, sport courts, travel camps, and archery ranges. Passive recreation areas encompass minimal development because they accommodate fewer people and less intense activity. These are usually limited to bicycle paths, hiking trails, picnic shelters, and boardwalks.

Because of the nature and function of the district, existing development is minimal. Future facilities constructed within the district shall set the precedence for architectural style, form and massing, and building materials for the district. They shall relate to the existing architecture prevalent on South Post, which is Colonial Revival. Buildings shall be one- or two-stories in height, rectilinear, and have a gabled roof. Entrances may be emphasized with an additional gable or canopy structure. Architectural detailing and ornamentation is minimal to blend with the natural context of the district.



Outdoor Recreation Center

Exterior building materials may include (Table 3.16):

- Red brick with a stone base and/or brick, stone, or painted wood trim,
- Standing seam metal or asphalt shingles on gabled roofs, or a gravel ballast or membrane system on flat roofs with parapets,
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors may include glass panes.

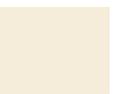


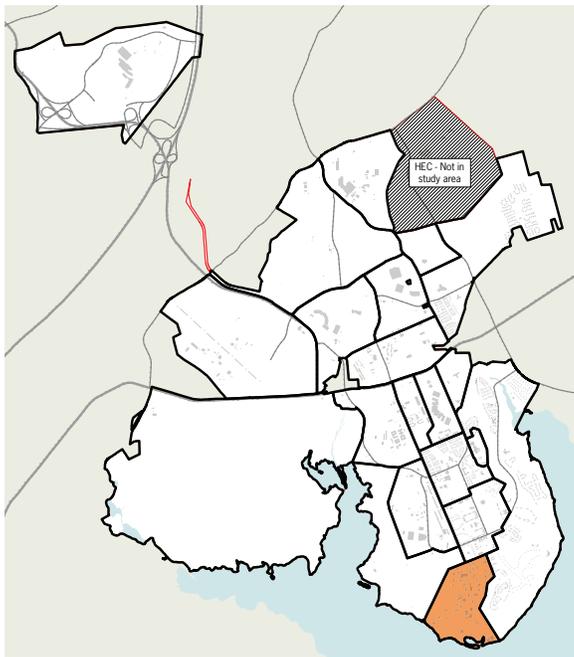
Environmental Education Center



Wooden clad structures in the Family camp area

Table 3.16: Recreation District Building Materials and Colors

<p><i>Wall Facade: Primary Materials and Colors</i></p>							
<p><i>Wall Facade: Secondary Materials and Colors</i></p>							
<p><i>Wall Entablature: Materials and Colors</i></p>							
<p><i>Wall Base: Materials and Colors</i></p>							
<p><i>Roof: Materials and Colors</i></p>							
<p><i>Fenestration: Glass, Doors, and Window Frames</i></p>							
<p><i>Trim: Fascia, Soffits, and Coping</i></p>							
<p><i>Appurtenances: Gutters, Downspouts, Canopies, and Railings</i></p>							
<p><i>Related Site Structures: Walls, Screens, and Fences</i></p>							



300 Area District Key Map

300 Area District

The 300 Area District is a mixture of administrative/office and research and development facilities. Historically, development within the restricted area responded to the topography of the site as well as the function of the buildings, resulting in visually inconsistent architectural styles and materials utilized. This palette presents a varied and disorganized visual appearance to the district.

Current facilities vary in size from large multistory facilities to small single-story facilities and range in form from compound structures to simple rectilinear structures. This variation is primarily due to the building's form following its function or additions to existing facilities. Roof lines also vary from gabled to hip to flat.

The IPS recommends that with future development a consistent design palette for the district be maintained. This includes the building form, scale, facade detailing, materials and colors. Future development shall blend with adjacent buildings' style as closely as possible to create visual continuity. Building massing shall follow function but complement adjacent structures and appear as one cohesive facility. Building heights shall not exceed eight stories. Roofs may be gabled or flat with parapets to hide mechanical equipment. Architectural detailing and ornamentation shall be minimal to blend with the context of the district.

Exterior building materials shall follow those outlined in Table 3.17 to create visual uniformity:

- Red or tan brick with a brick or stone base and/or brick, stone, or painted wood trim,
- Standing seam metal or asphalt shingles on gabled roofs, or a gravel ballast or membrane system on flat roofs with parapets,
- Extruded aluminum or hollow steel frames may be used for door and window frames. Windows may be punched style with glazing for security. Doors may include glass panes.

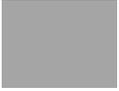
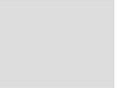
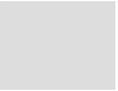


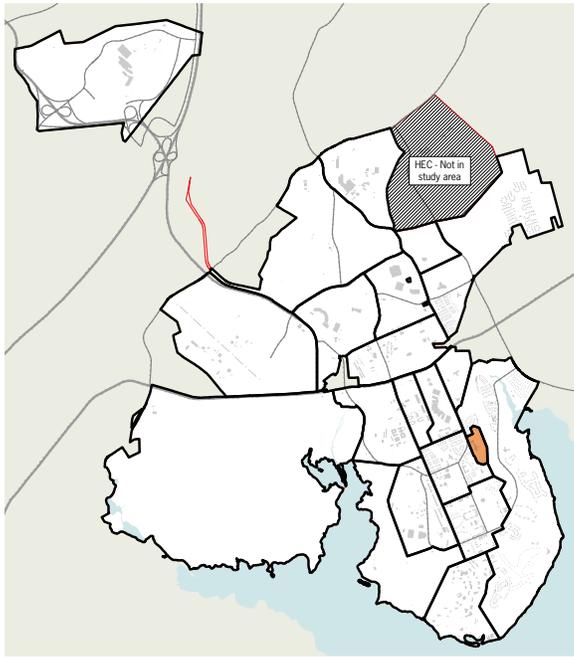
U.S. Army Research, Development, and Engineering Command (RDECOM) Communications-Electronics Research, Development and Engineering Center (CERDEC) Night Vision and Electronic Sensors Facility



RDECOM Facility

Table 3.17: 300 Area District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>							
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Brick Tan</p>	 <p>W3-Stone/Concrete Natural/Beige</p>	 <p>W4-Painted Red Brick (Pantone 467 C)</p>	 <p>W5-Painted Tan (Pantone 467 C)</p>	 <p>W6-Painted Cream (Pantone 9140 C)</p>	 <p>W7-Painted White (Pantone 9063 C)</p>		
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Stone/Concrete Natural/Beige</p>	 <p>E2-Painted Tan (Pantone 467 C)</p>	 <p>E3-Painted Cream (Pantone 9140 C)</p>	 <p>E4-Painted White (Pantone 9063 C)</p>				
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>	 <p>B2-Brick Tan</p>	 <p>B3-Stone/Concrete Natural/Beige</p>					
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Shingles Dark Gray</p>	 <p>R2-Gravel Ballast Gray Mix</p>	 <p>R3-Membrane/Metal Gray (Pantone 877 C)</p>	 <p>R4-Membrane/Metal Light Gray (Pantone 420 C)</p>	 <p>R5-Membrane White (Pantone 9063 C)</p>			
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>	 <p>F2-Glass Light Gray Tint</p>	 <p>F3-Painted Dark Brown (Pantone 411 C)</p>	 <p>F4-Painted Gray (Pantone 877 C)</p>	 <p>F5-Painted Tan (Pantone 467 C)</p>	 <p>F6-Painted Light Gray (Pantone 420 C)</p>	 <p>F7-Painted Cream (Pantone 9140 C)</p>	 <p>F8-Painted White (Pantone 9063 C)</p>
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Painted Dark Brown (Pantone 411 C)</p>	 <p>T2-Painted Gray (Pantone 877 C)</p>	 <p>T3-Painted Tan (Pantone 467 C)</p>	 <p>T4-Painted Light Gray (Pantone 420 C)</p>	 <p>T5-Painted Cream (Pantone 9140 C)</p>	 <p>T6-Painted White (Pantone 9063 C)</p>		
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Dark Brown (Pantone 411 C)</p>	 <p>A2-Painted Gray (Pantone 877 C)</p>	 <p>A3-Painted Tan (Pantone 467 C)</p>	 <p>A4-Painted Light Gray (Pantone 420 C)</p>	 <p>A5-Painted Cream (Pantone 9140 C)</p>	 <p>A6-Painted White (Pantone 9063 C)</p>		
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>	 <p>S2-Stone/Concrete Natural/Beige</p>	 <p>S3-Painted Tan (Pantone 467 C)</p>	 <p>S4-Painted Cream (Pantone 9140 C)</p>				



Administrative Campus District Key Map

Administrative Campus District

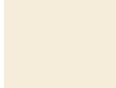
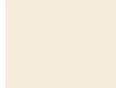
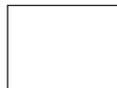
The Vision and Development Plan of the Real Property Master Plan proposes to redevelop the DeWitt Army Community Hospital site and associated parking into an administrative campus in the long term. The regulating plan allows a four- to eight-story maximum multi-mission partner office building on the site with surface parking or a structure to accommodate the employees. This development will act as a central employment anchor that is easily walkable to the Town Center development along 12th Street.

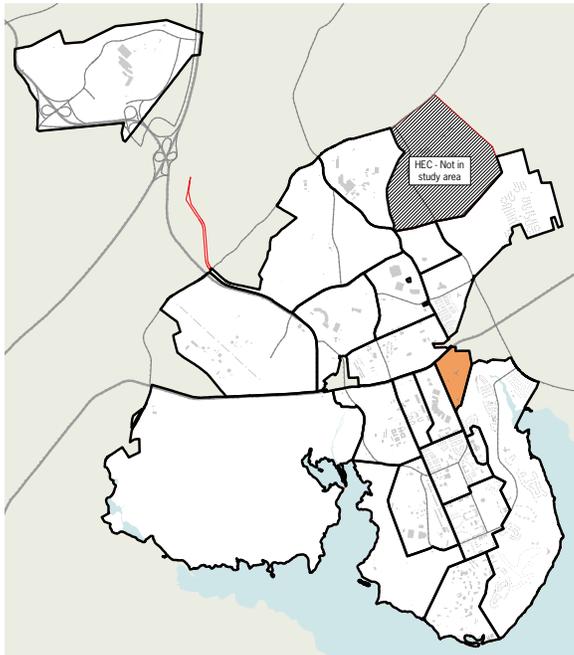
Depending on the approved building heights, the architectural character and form of the proposed facilities will vary. Four-story buildings shall match the architectural style and character of the adjacent Town Center development and design palette along 12th Street. Stories five to eight shall be setback from the fourth-story to give prominence to the fourth-story cornice. The setback will also give a pedestrian scale to the large facility. The architecture of the buildings will be Colonial Revival in style to blend with the surrounding context, simple rectilinear in form, and have gabled roofs. Exterior detail will include substantial cornice, molding, window and door dressings, facade articulations, and awnings at entrances. Table 3.18 summarizes the materials and colors to be used in the Administrative Campus District.

Exterior building materials for four-story buildings may include (Table 3.18):

- Red brick with brick, stone, or painted wood trim and facade articulation,
- Standing seam metal or asphalt shingles on gabled roofs, or a gravel ballast or membrane system on flat roofs with parapets,
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors preferably include glass panes.

Table 3.18: Administrative Campus District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>					
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>					
<p><i>Wall Entablature:</i> Materials and Colors</p>					
<p><i>Wall Base:</i> Materials and Colors</p>					
<p><i>Roof:</i> Materials and Colors</p>					
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>					
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>					
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>					
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>					
					



South Post Community Support District Key Map

South Post Community Support District

The South Post Community Support District includes facilities that support military personnel and their families, residents, and civilian employees. These include recreational and sports fields, Fisher House, a CDC, and the Community Center.

The overall architectural style of the district is traditional with contemporary details, making it transitional in nature. This style blends with the adjacent modern architecture of the hospital and the traditional architecture of South Post. Buildings are smaller in scale at one- to four-stories and simple rectilinear forms with gabled or hipped roofs. Main entrances are emphasized with a gabled awning and architectural detailing. Exterior detailing may include cornices, molding, window and door dressings, railings and facade articulations.

Exterior building materials may include (Table 3.19):

- Red brick with a brick or stone base and/or brick, stone, or painted wood trim,
- Slate or asphalt shingles, or metal siding on gabled or hipped roofs or,
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors may include glass panes.

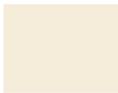


Fort Belvoir Community Center



Fisher House

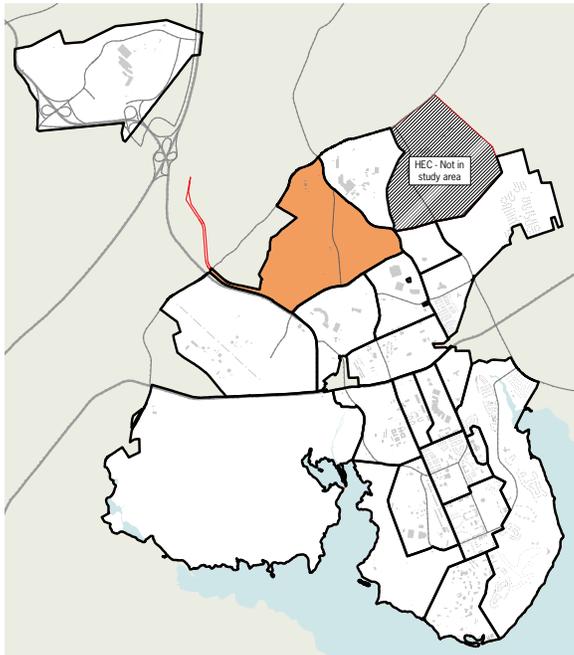
Table 3.19: South Post Community Support District Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 <p>W1-Brick Red</p>						
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 <p>W2-Stone/Concrete Natural/Beige</p>	 <p>W3-Painted Red Brick (Pantone 467 C)</p>	 <p>W4-Painted Tan (Pantone 467 C)</p>	 <p>W5-Painted Light Gray (Pantone 420 C)</p>	 <p>W6-Painted Cream (Pantone 9140 C)</p>	 <p>W7-Painted White (Pantone 9063 C)</p>	
<p><i>Wall Entablature:</i> Materials and Colors</p>	 <p>E1-Painted Tan (Pantone 467 C)</p>	 <p>E2-Painted Light Gray (Pantone 420 C)</p>	 <p>E3-Painted Cream (Pantone 9140 C)</p>	 <p>E4-Painted White (Pantone 9063 C)</p>			
<p><i>Wall Base:</i> Materials and Colors</p>	 <p>B1-Brick Red</p>	 <p>B2-Stone/Concrete Natural/Beige</p>					
<p><i>Roof:</i> Materials and Colors</p>	 <p>R1-Shingles Dark Gray</p>	 <p>R2-Gravel Ballast Gray Mix</p>	 <p>R3-Membrane/Metal Gray (Pantone 877 C)</p>	 <p>R4-Membrane/Metal Light Gray (Pantone 420 C)</p>	 <p>R5-Membrane White (Pantone 9063 C)</p>		
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 <p>F1-Glass Clear</p>	 <p>F2-Glass Light Gray Tint</p>	 <p>F3-Painted Gray (Pantone 877 C)</p>	 <p>F4-Painted Tan (Pantone 467 C)</p>	 <p>F5-Painted Light Gray (Pantone 420 C)</p>	 <p>F6-Painted Cream (Pantone 9140 C)</p>	 <p>F7-Painted White (Pantone 9063 C)</p>
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 <p>T1-Stone/Concrete Natural/Beige</p>	 <p>T2-Painted Gray (Pantone 877 C)</p>	 <p>T3-Painted Tan (Pantone 467 C)</p>	 <p>T4-Painted Light Gray (Pantone 420 C)</p>	 <p>T5-Painted Cream (Pantone 9140 C)</p>	 <p>T6-Painted White (Pantone 9063 C)</p>	
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 <p>A1-Painted Red Brick (Pantone 467 C)</p>	 <p>A2-Painted Gray (Pantone 877 C)</p>	 <p>A3-Painted Tan (Pantone 467 C)</p>	 <p>A4-Painted Light Gray (Pantone 420 C)</p>	 <p>A5-Painted Cream (Pantone 9140 C)</p>	 <p>A6-Painted White (Pantone 9063 C)</p>	
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 <p>S1-Brick Red</p>	 <p>S2-Stone/Concrete Natural/Beige</p>	 <p>S3-Painted Tan (Pantone 467 C)</p>	 <p>S4-Painted Cream (Pantone 9140 C)</p>			

Golf Course/National Museum of the U.S. Army (NMUSA) District

The Golf Course/NMUSA District is divided into two main areas: the Fort Belvoir Golf Course and the future site for the National Museum of the U.S. Army.

The visual characteristics of the Fort Belvoir Golf Course are classical, matching those found in the Historic District on South Post. The clubhouse and ancillary structures overlook the pristine golf course and mature vegetation to create a picturesque viewshed. The Colonial Revival style buildings are rectilinear single story structures with architectural detailing and ornamentation that provide visual interest. Exterior detailing includes sloped roof lines with gables, vertically proportioned windows, and a prominent main entrance to emphasize the buildings' importance and formality. Exterior building materials include red brick with limestone or painted wood trim. Table 3.9 summarizes the Fort Belvoir Golf Course building materials and colors. Future development within this area shall match the existing architecture and building materials.



Regional District Key Map



Fort Belvoir Golf Clubhouse

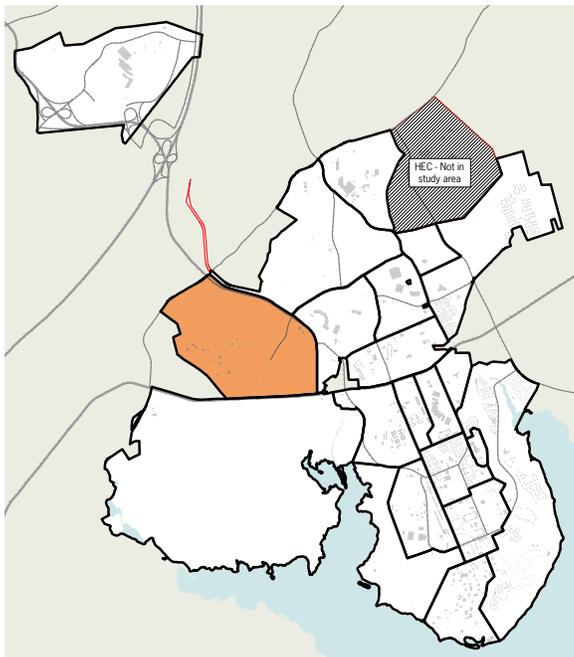
Because the National Museum of the U.S. Army is proposed as a prominent civic facility for the region, its architectural style is unique, creating a focal point on the site. The iconic building will be compound rectilinear forms that meet the objectives and requirements of its mission. The main entrance will be emphasized to reflect the importance and formality of the building, and shall address the entry plaza. Buildings materials are not specified here because of the facility's iconic style, but the design will incorporate materials and colors indicative to Fort Belvoir's architecture.



Fort Belvoir Golf Course and Clubhouse

Table 3.20: Golf Course Building Materials and Colors

<p><i>Wall Facade:</i> Primary Materials and Colors</p>		<p>W1-Brick Red</p>
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>		<p>W2-Painted White (Pantone 9063 C)</p>
<p><i>Wall Entablature:</i> Materials and Colors</p>		<p>E1-Painted White (Pantone 9063 C)</p>
<p><i>Wall Base:</i> Materials and Colors</p>		<p>B1-Brick Red</p>
		<p>B2-Stone/Concrete Natural/Beige</p>
<p><i>Roof:</i> Materials and Colors</p>		<p>R1-Shingles Dark Gray</p>
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>		<p>F1-Glass Clear</p>
		<p>F2-Painted White (Pantone 9063 C)</p>
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>		<p>T1-Stone/Concrete Natural/Beige</p>
		<p>T2-Painted White (Pantone 9063 C)</p>
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>		<p>A1-Painted White (Pantone 9063 C)</p>
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>		<p>S1-Brick Red</p>
		<p>S2-Stone/Concrete Natural/Beige</p>
		<p>S3-Painted White (Pantone 9063 C)</p>



Davison Army Airfield District Key Map

Davison Army Airfield (DAAF) District

DAAF District was originally designed as an airfield and continues to serve this purpose to this day, creating an architectural character that is quite distinct from other sections of Fort Belvoir. The visual characteristics of the district are prescribed by the mission partner's mission needs and requirements; therefore, development is suburban in nature and spread over a large parcel of the land. Facilities are organized around the runway with ancillary and smaller functions located toward the perimeter.

The overall character of the DAAF District is industrial as its form follows its function, which is storage and airfield operations. Facilities are utilitarian in appearance comprised of large rectilinear forms with minimal facade articulation. Exterior detailing includes various sloping or flat roof lines, large sliding doorways, and either clerestory windows or vertically proportioned windows. Many of the buildings express their structural systems as design features.



Administrative facility at Davison Army Airfield

Exterior building materials may include (Table 3.21):

- Painted steel or aluminum metal siding,
- Metal standing seam roof panels or membrane roof system, and
- Extruded aluminum or hollow steel frames may be used for door and window frames. Doors may include glass panes.



Lewis L Stone Hangar at Davison Army Airfield

Table 3.21: DAAF Building Materials and Colors

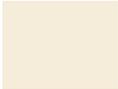
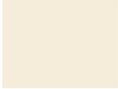
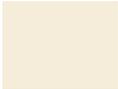
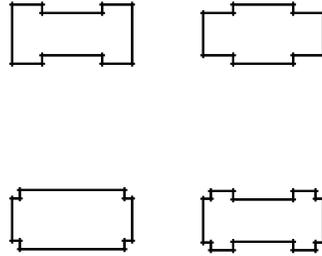
<p><i>Wall Facade:</i> Primary Materials and Colors</p>	 W1-Painted Tan (Pantone 467 C)	 W2-Painted Cream (Pantone 9140 C)						
<p><i>Wall Facade:</i> Secondary Materials and Colors</p>	 W3-Painted Tan (Pantone 467 C)	 W4-Painted Cream (Pantone 9140 C)	 W5-Painted White (Pantone 9063 C)					
<p><i>Wall Entablature:</i> Materials and Colors</p>	 E1-Painted Tan (Pantone 467 C)	 E2-Painted Cream (Pantone 9140 C)	 E3-Painted White (Pantone 9063 C)					
<p><i>Wall Base:</i> Materials and Colors</p>	 B1-Painted Tan (Pantone 467 C)							
<p><i>Roof:</i> Materials and Colors</p>	 R1-Membrane/Metal Gray (Pantone 877 C)	 R2-Membrane/Metal Light Gray (Pantone 420 C)	 R3-Membrane White (Pantone 9063 C)					
<p><i>Fenestration:</i> Glass, Doors, and Window Frames</p>	 F1-Glass Clear	 F2-Glass Light Gray Tint	 F3-Glass Frosted	 F4-Painted Dark Brown (Pantone 411 C)	 F5-Painted Gray (Pantone 877 C)	 F6-Painted Tan (Pantone 467 C)	 F7-Painted Cream (Pantone 9140 C)	 F8-Painted White (Pantone 9063 C)
<p><i>Trim:</i> Fascia, Soffits, and Coping</p>	 T1-Metal Tan (Pantone 467 C)	 T2-Metal Cream (Pantone 9140 C)	 T3-Metal White (Pantone 9063 C)					
<p><i>Appurtenances:</i> Gutters, Downspouts, Canopies, and Railings</p>	 A1-Metal Tan (Pantone 467 C)	 A2-Metal Cream (Pantone 9140 C)	 A3-Metal White (Pantone 9063 C)					
<p><i>Related Site Structures:</i> Walls, Screens, and Fences</p>	 S1-Painted Tan (Pantone 467 C)	 S2-Painted Cream (Pantone 9140 C)	 S3-Painted White (Pantone 9063 C)					

Table 3.22: Plan Types

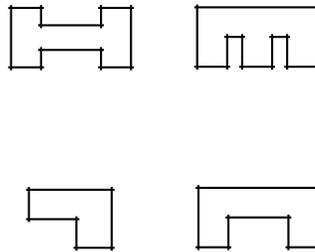
SIMPLE

Rectangular shape with some surface articulations to denote entrances or highlight architectural form.



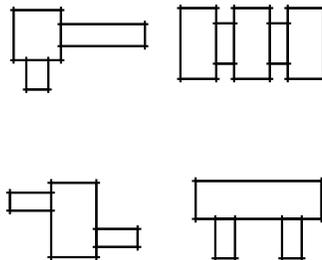
COMPOUND

More than one rectangular shape with similar proportions that are connected.



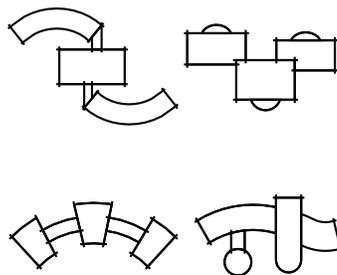
COMBINED

More than one rectangular shape of varying proportions that are connected.



COMPLEX

Having a great variation in shape and diversity of dimensional proportions, appropriate for iconic campuses.



Building Design Principles

This section provides general requirements that apply to all or most structures on Post. Think of it as a primer in basic design. Presented here are strategies and requirements that need to be considered for any type of new construction or renovation to ensure a higher quality environment for building occupants.

Plan Types

Buildings first take shape in plan to determine how functions will be accommodated. Most buildings at Fort Belvoir are based on a simple rectangular plan. From there, variations are allowed to occur, depending on the building's prototype and district where the new structure is to be built. Building plans must be related to the plans of adjacent buildings within a district to maintain a uniform aesthetic. Plan types follow, and basic types are described here.

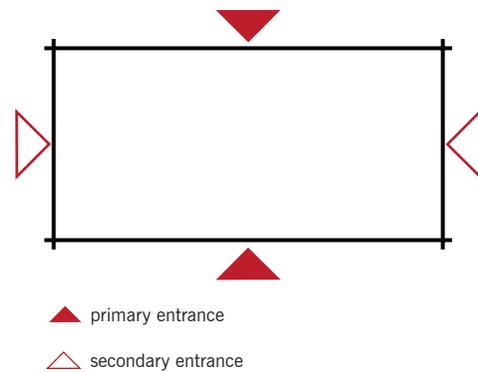


Figure 3.2: Basic Plan Rectilinear Form

Massing Types

Building massing is the projection of a plan in three dimensions to establish height and therefore giving the building form. Most buildings on Post are either a simple rectilinear cube or variations of this. When determining massing, the structure will be of similar proportions to adjacent buildings within a district to maintain a uniform aesthetic.

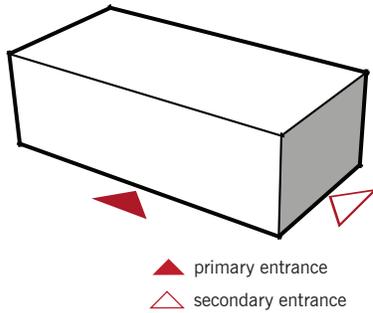
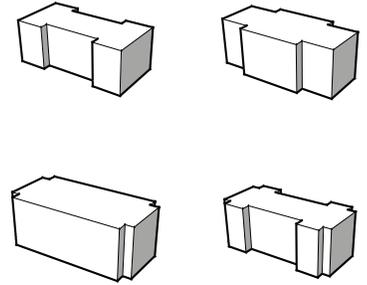


Figure 3.3: Basic Mass Rectilinear Form

Table 3.23: Massing Types

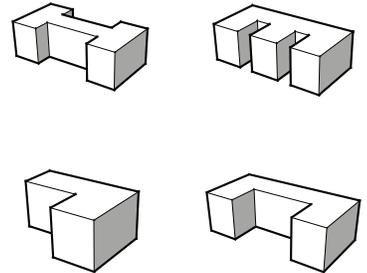
SIMPLE

Single rectilinear form of uniform height.



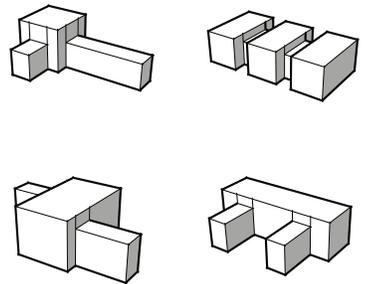
COMPOUND

More than one rectilinear form of uniform height.



COMBINED

More than one rectilinear form of varying heights.



COMPLEX

Having a great variation in form, shape, and height. Shape can be curved or rectilinear.

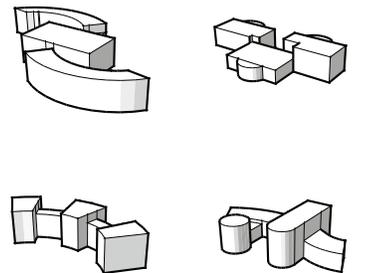
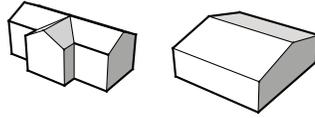


Table 3.24: Roof Types

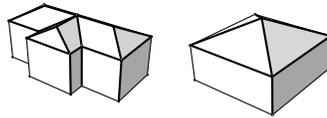
GABLED

Having two sloping planes joined at a central rise with a triangular gable wall at each end.



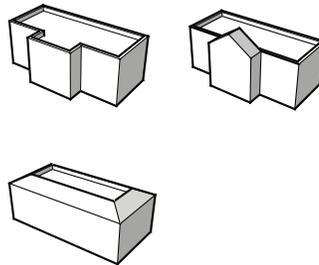
HIP

Having sloping sides and ends which can meet along a central rise or a point.



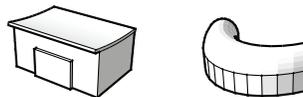
FLAT WITH PARAPET

Having a slight pitch for drainage and concealed by a parapet wall. UFC requires a minimum 0.5 inch rise per one foot horizontal run slope. Parapets are used to screen roof top equipment. Parapet walls may be articulated with a gable wall or sloped roof.



COMPLEX

Having unique form or combining several forms together.



Roof Types

Roofs on most buildings are a sloped gabled form, where the rise runs the length of the building. The roof pitch is determined by the height of the rise and the overall depth of the building. As the depth increases, the slope must diminish in relative fashion. Roof form will be of similar proportions to adjacent buildings within a district to maintain a uniform aesthetic.

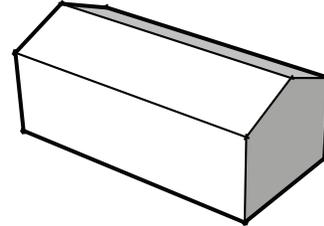


Figure 3.4: Basic Gabled Roof

Elevation Types

Buildings on the Post have traditionally expressed a tripartite division of the facade, composed of a base, middle, and cornice. This three-part division is horizontally expressed, and the proportions shall adjust proportionally to the building height. Buildings shall have an expressed base and cornice that differentiate it from the middle portion of the facade.

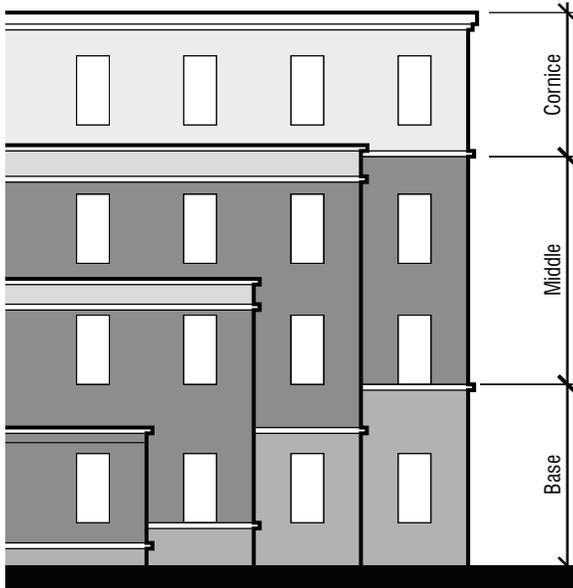
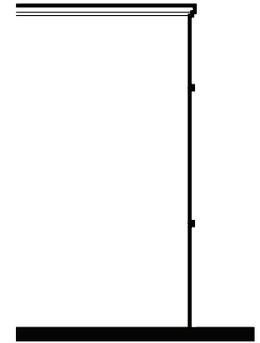


Figure 3.5: Elevation proportions

Table 3.25: Elevation Types

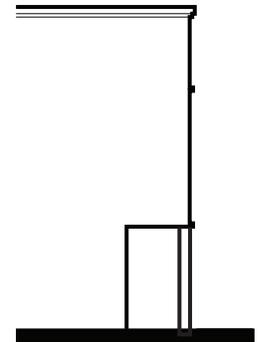
VERTICAL

Wall elevation has a single vertical plane.



ARCADE

The first floor is stepped back to create an overhead passage. The upper floors may be supported with columns.



SETBACK

The upper floors are stepped back to add visual interest or make the facade seem shorter.

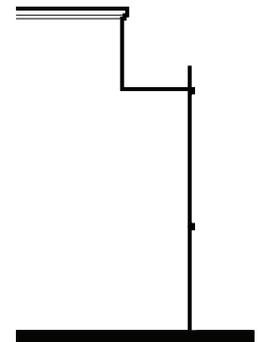
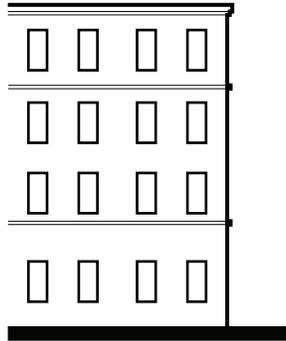


Table 3.26: Window Types

Window Types

Type 1: PUNCHED WINDOWS

For buildings with masonry facade, windows will be placed within a constructional logic of load-bearing walls. Window openings will be vertically proportioned and aligned vertically and horizontally.



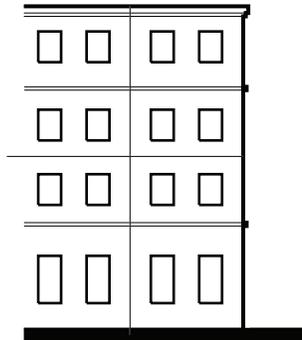
Many buildings on Post are masonry and observe a traditional architectural design aesthetic. Their windows are usually arranged in a manner that fits load-bearing wall construction.

Buildings in most districts will follow window Types 1 and 2. On the first floor, window openings can make up 10-90 percent of the wall area, depending on the use. For upper floors, the window openings will make up 10-20 percent of the wall area.

Buildings with Type 3 windows have the widest latitude in design. For all types of windows, the style, configuration, and proportions must complement or match those of adjacent buildings.

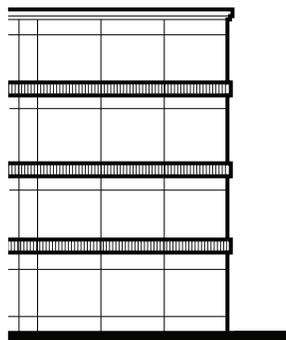
Type 2: PANEL WINDOWS

For buildings using tilt up construction where the facade is primarily masonry, window openings shall have a constructional logic of load-bearing walls. Windows will be vertically proportioned and aligned vertically and horizontally.



Type 3: UNIT SYSTEM WINDOWS

For buildings using a curtain wall construction where the facade is primarily glazing, metal, or other material other than masonry, the design parameters allow the greatest amount of flexibility.



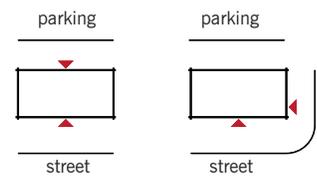
Building Entrance Types

A building entrance is a primary feature of any building design. It shall be well defined and recognizable as the point of access, regardless of the size or scale of the building. In some instances, there may be two or three primary entrances/facades, or a secondary entry/facade requiring special treatment due to its location on the Post. Examples include a building sited on a corner or a building where mission partners commonly use a primary entrance at the rear, while its ceremonial entrance faces the primary street. The entry treatment, in terms of level of architectural detail and prominence, must adhere to a logical order of hierarchy and aesthetic design within the context of the building and site. Design guidelines for entrances include:

- The building entrance shall be in a prominent location and oriented toward primary adjacent public spaces, such as a courtyard, lawn, parking lot, or street.
- Design details of a building entrance shall provide continuity with its other entrances and those of adjacent buildings.
- The style, color, texture and scale of an entrance canopy or porch shall be compatible with existing buildings.
- Vestibules, when required, shall be provided within the existing building envelope, if possible.
- Replacement doors and storm doors must be architecturally compatible with the existing building style. Modifications or alterations to entrances, doors, and vestibules of historic buildings are not allowed.
- Accessible ramps, railing, and signage shall be consistent with building character, and placed as to not detract from its appearance. This is most important for historic structures. Americans with Disabilities Act (ADA) compliance must be considered during design of new construction.
- Design of the walkway and paved area in front of the entrance doors is directly related to building function and number of occupants using the facility. (More information on this is provided here, under Plazas and Courtyards.)

Table 3.27: Building Entrance Types

PRIMARY



SECONDARY

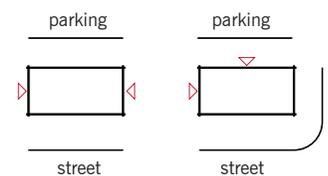
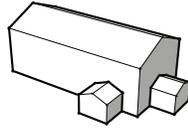


Table 3.28: Building Addition Types

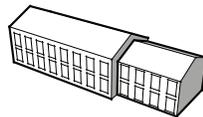
MINOR

Additions that account for less than 10 percent of the overall floor area. To be located in less prominent visual locations at the side or rear. Materials, colors, and architectural detailing must harmonize with the larger building.



MAJOR

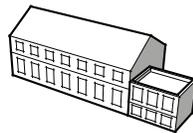
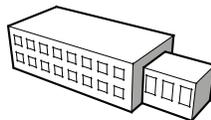
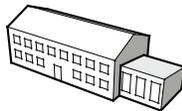
Additions that account for greater than 10 percent of the overall floor area, Must incorporate materials, colors, and architectural detailing that matches or is compatible with the existing building. May be symmetrically or asymmetrically disposed.



NOT ALLOWED

Additions that vary greatly from the character of the existing buildings such as:

- Fenestrations of a different proportion and distribution.
- Roof that is not stylistically or functionally compatible.
- Articulation and surface treatment that does not match.
- Materials and colors that are not appropriate equals.



Building Addition Types

Additions and major alterations shall complement the existing building. Replication of historic buildings is not required or even desired. However, it is imperative that modifications and ongoing building maintenance respect and enhance the existing or intended character of each theme. All additions must adhere to the following guidelines:

- Additions must be of an architectural style consistent and compatible with the existing building. Respect the massing, form, and scale of the original building. Materials and colors must be similar to that of the existing building.
- Roof forms of additions must match the roof forms of the existing building. All gabled or hipped roof slopes within a single building must be equal.
- Additions must generally be ancillary to the existing building, occurring to the rear or to the side as a separate wing. They shall not be of larger floor area than the original building.
- All additions must comply with life safety and force protection standards. If an addition increases the building's area by 50 percent, the whole building must meet current AT/FP requirements.
- Additions to buildings in the Historic District, while not discouraged, must be compatible with the historic building. Designs for additions are subject to Section 106 compliance and must be coordinated with the Virginia State Historic Preservation Office (SHPO).

Plazas and Courtyards

Exterior spaces such as plazas, courtyards, employee break areas, and recreation areas provide desirable places between the outdoors and indoors. Within these spaces, people can enjoy a variety of functions, from passive activities (such as reading, eating, or sitting) to more active uses (such as recreation). (See Figure 3.6.) These spaces can be informal, formal, private, semi-private, and public places. They can be designed as a transition that takes the user from one building to another, a place to sit and relax, or a formal entrance space to a building or group of buildings. The design of plazas and courtyards depends heavily on the building's function and number of occupants. Design guidelines for plazas and courtyards include:

- Orientation of an exterior space may have an inward or outward focus (Figure 3.7). An inward focus refers to spaces that concentrate on an internal focal point, such as a fountain or sculpture. Outward focus refers to spaces that take advantage of good views and vistas beyond the space.
- Maintain a 1:1, 2:1, or 3:1 ratio between the horizontal plane and height of vertical elements to ensure a user-friendly space.
- Design spaces suitable for pedestrian use by integrating seating, lighting, planting, and special paving.
- Provide an east-west orientation, a screen for north winds, and shade against the summer sun.
- Relate courtyards and plazas to existing buildings and surroundings. Courtyards are typically small open spaces defined by buildings on three or four sides. Plazas are typically larger open spaces defined by buildings on one or two sides.
- Provide barrier-free pedestrian accessibility into the space.
- Use plants to articulate space by establishing a ground plane (special paving, ground cover), middle plane (trees, shrubs), and an overhead plane (tree canopy, trellis) to modify the climate and provide scale and aesthetic elements.
- Use paving to provide a sense of direction and scale, indicate level changes, separate pedestrian and vehicular traffic, and for visual accent.
- Plazas and courtyards need to meet AT/FP requirements. Wide, paved entrance plazas need vehicular barriers.

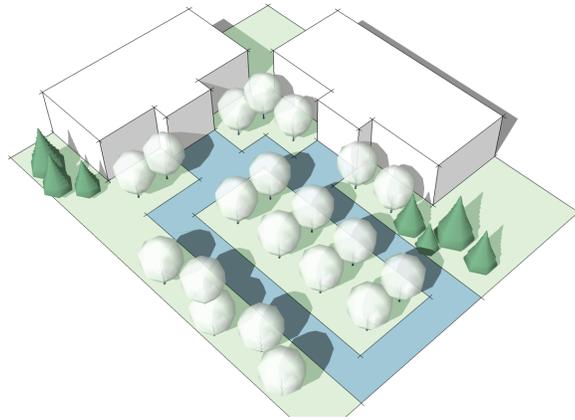
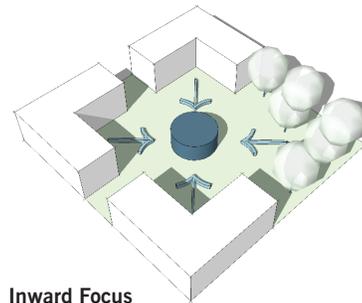
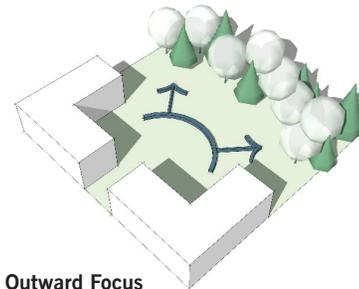


Figure 3.6: Courtyard Spaces: designed to provide interior spaces and amenities for the pedestrian.



Inward Focus



Outward Focus

Figure 3.7: Inward focused and outward focused design diagrams.



Warrior Transition Complex interior courtyard

Service Areas

Service areas need to provide access for service vehicles while still meeting AT/FP requirements. This may require bollards and other such devices to permit necessary equipment access to the facility. Access to loading docks must have adequate turning radius and backup/circulation area for vehicles accessing the loading docks.

Service areas, such as loading docks, utility access/equipment, and trash dumpsters shall be screened from the views of primary use areas such as entrances, courtyards, gathering areas, streets, and parking lots. Screening can be an enclosure using appropriate materials (i.e., walls, berms, landscaping, or any combination thereof). Screen walls shall be between six and eight feet high and shall be of compatible materials with the adjacent building.

Trash and garbage collection areas must be located a minimum of 12 feet from troop billeting, family housing areas (containing more than 12 units), and stand-alone retail facilities. They will be placed a minimum of 12 feet from all other inhabited structures (UFC 4-010-01, Table B-1). Garbage collection areas must accommodate two dumpsters, one for trash disposal and one for recycling. Refer to Chapter 6 of this IPS - Dumpsters for location and design details.

Storage Types

Accommodating storage within the existing structure is the preferred solution. If exterior storage sheds are required, the following guidelines shall be met:

- Storage sheds, either attached (Figure 3.8) or detached from a primary building, can be used in residential neighborhoods and in relation to small/medium-sized institutional buildings. Exterior storage sheds are not appropriate for large buildings.
- Storage sheds must be located in an organized fashion near or adjacent to existing structures, rather than in open spaces. As the size of buildings increases, they can be proportionately located farther away.
- Storage sheds must be located on the private (rather than the public) side of the building.
- Materials and colors must harmonize with adjacent buildings.
- The size of storage sheds must be proportionate to the size of adjacent related buildings: between 5 percent and 10 percent of main building floor area.
- Storage sheds must meet AT/FP standards.
- Exterior storage sheds are not permitted for large institutional buildings or large, internal access residential buildings.

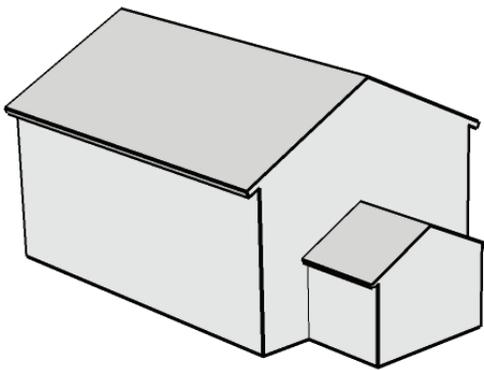


Figure 3.8: Attached storage

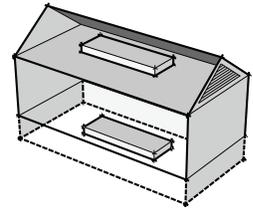
Mechanical / Communication Equipment Location Types

Refers to heating, ventilation, and air conditioning (HVAC), duct work, antennas, conduits, plumbing, or any other equipment necessary for building and mission functions. Equipment shall ideally be located internally to conceal from public view.

Table 3.29: Equipment Location Types

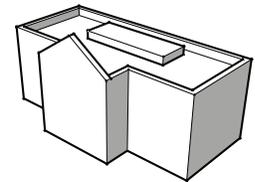
INTERNAL

Located within the building envelope either in the roof and/or the basement levels. Louvered gables allow ventilation and access. This is the preferred location for buildings in historic areas or visually prominent locations.



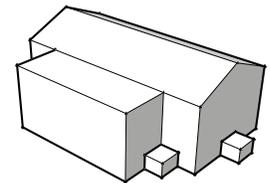
ROOF TOP

Located on the roof and screened from view by parapet walls/roofs. Visible equipment must be painted to minimize its visual impact and/or screened with walls that match the architectural character.



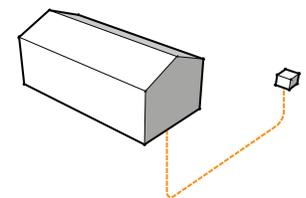
ADJACENT

Located on the ground and attached at the side or rear of a building, in a location that is not visually prominent. Enclosure must match the style, materials, and color of the architecture.



REMOTE

Located on the ground and some distance from the building(s) it services. Must be located away from primary public areas, and screened by walls, fences, vegetation, or any combination thereof that complements the surroundings. Sites for multi-element antennas and satellite/communication dishes (antenna farms) must be approved by DPW and the National Capital Planning Commission (NCPC).





Building 216 is an example of a historic building adaptively reused and maintained on Post.



Belvoir Village consists of historic homes in the Colonial Revival style.



The Thermo-con House on Post is a unique historic structure listed on the Virginia Landmark Register.

Historic Buildings

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. Additionally, the Fort Belvoir Historic District is subject to the standards set forth in the Fort Belvoir Integrated Cultural Resources Management Plan (ICRMP). When working with historic properties, the Army uses the following three categories:

- **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.
- **Historic District.** This is a distinct group of buildings, structures, or landscapes that possesses significance, and is listed in or eligible for listing in the National Register.
- **National Historic Landmarks.** These are buildings, structures, or landscapes that are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States.

Additional guidance pertaining to historic preservation and treatments can be found in the following resources:

- Fort Belvoir VDP - Chapter 2: Cultural Resources;
- Maintenance, Operations, and Planning Programmatic Agreement (MOP PA);
- Appendix B, Historic Preservation Guidelines in this IPS;
- Chapter 6 within Army Regulation AR 200-1;
- Department of the Army Pamphlet 200-4;
- National Park Service's Secretary of the Interior's Standards for the Treatment of Historic Properties; and
- Technical Instruction (TI) 800-01, Design criteria, Chapter 16, Preservation of Historic Structures.

Adaptive Reuse Guidelines

Historic buildings may be viable candidates for adaptive reuse when adherence to recognized standards can be met. Adaptive reuse is a process by which existing facility vacancies are evaluated for a new use. The evaluation process is meant to be a collaboration with the DPW, whose staff can assist in the best reuse strategies for incoming programs. This process may include evaluating the existing facility for adaptive reuse viability or demolishing the existing facility and rebuilding on the site in a more cost effective, long term manner (i.e., higher density development, less impervious surface, more energy efficient, sustainable materials, better stormwater management, structured parking where appropriate). Understanding the scope and requirements of the incoming program will best assure a thorough site selection process. A preferred course of action can then be derived from an extensive number of options that were examined during initial siting studies. Final approval can be made by the DPW, Garrison Command, and other stakeholders. The following guidelines are used in the evaluation process of existing facilities for adaptive reuse:

Site Planning

- Land use regulations and master planning objectives
- Functional relationships with adjacent land uses and facilities
- Conformity to land use regulations and planning objectives
- Capacity for future expansion
- Environmental, operational, or man-made constraints which would inhibit reuse
- Low impact development and environmental stewardship
- Land constraints and the impact for reuse

Architecture

- Facility dimensions for the space required by the incoming program
- Existing physical condition of the building that supports an extended life span
- Structural integrity to accommodate the incoming program
- Adaptability to new uses and associated building codes and safety regulations
- Mechanical building systems, utilities, and efficiency of interior space for the program
- Building green using standards such as LEED®
- Cost benefit analysis for renovation and total lifestyle costs versus new construction
- Adherence to IPS standards
- Adherence to historic preservation regulations (if applicable)

Circulation

- Proximity to regional highways
- Access to Installation roads and circulation
- Amount of traffic impact to road infrastructure
- Access to pedestrian and bicycle circulation routes
- Parking requirements
- Proximity to Installation entrances

Landscape

- Impacts to existing landscape
- Need for screen/buffer planting
- Landscaping for streetscapes and parking
- Landscape maintenance
- Improvements that can adhere to IPS standards
- Opportunities that incorporate LEED®/ environmental stewardship

Site Elements

- Capacity for new site elements (site furnishings, shelters, lighting, signage)
- Capacity of existing utilities (water, electrical, waste, stormwater, gas)
- Adherence of new site elements to IPS standards

Force Protection

- Adherence of current conditions to AT/FP requirements
- Capacity to meet security need of incoming program
- Potential to provide adequate AT/FP

Utility Upgrades

- Adequate provision for new building requirements
- Underground/concealed
- Include all service areas (i.e., gas, electric, water, sewer, telecommunications, IT)

Sustainable Design 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, as well as conserve energy. Sustainability guidelines identified in this section are based on those at the time of publication of this IPS. Design guidance from the Department of Energy, Headquarters - Department of the Army, U.S. Army Corps of Engineers, and others will continue to evolve as the Federal Government identifies sustainability and energy related goals and initiatives. Each design team and project manager is responsible for identifying all applicable requirements early in the design program to ensure compliance with applicable regulations and laws.

Sustainable Design Regulations

The following paragraphs discuss the Leadership in Energy and Environmental Design – New Construction rating to be met by FY 2008 and beyond programs as well as other major legislation and policy that incorporate sustainable design features into Army facilities.

- **Army Sustainable Design and Development Policy Update – Environmental and Energy Performance, October 2010.** This memorandum summarizes current Army policy on a wide range of issues including building energy efficiency, stormwater management, and water conservation. Requirements are phased in including adoption of ASHRAE 189.1, LEED certification with USGBC, and implementation of Section 438 of EISA 07. The policy mandates solar hot water systems for 30 percent of a new buildings demand. It also reaffirms requirements to explore renewable energy for each project, reduce water consumption, install cool roofs where applicable, and implement enhanced commissioning.
- **Army Sustainable Design and Development Policy Update – Life-Cycle Costs, April 2007.** Requires completion of life-cycle cost analysis of capital investments that relate to energy conservation measures in accordance with 10 CFR part 436. This is intended to reduce the total ownership cost of facilities as well as improve energy efficiency. The policy also requires that value engineering studies incorporate Sustainable Design and Development Principles and maximize points in the water efficiency and energy optimization categories of the LEED® rating system. In addition, opportunities to include renewable energy must be investigated for each project.
- **Leadership in Energy and Environmental Design – New Construction (LEED-NC®).** For all FY 2008 military vertical building construction and later year projects, the Army sustainable rating level standard is the U.S. 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. Beginning in FY 2013, all qualified projects must be officially certified by the USGBC as achieving the Silver rating under LEED. LEED® Project checklists are available on the website at www.usgbc.org.
- **Energy Independence and Security Act (EISA) 2007.** Section 438 of this law creates additional stormwater management requirements that federal facilities must comply with. These requirements are separate from the Clean Water Act and encourage the use of Low Impact Development techniques in site design. Other portions included in this Federal law require building designs to produce 30 percent of the hot water demand through the use of solar power, and that life cycle cost analyses can utilize a 40 year life-cycle.
- **Energy Policy Act 2005.** This law requires that all new federal buildings be designed to consume 30 percent less energy than those built according to the ASHRAE 90.1 2004 standard. It also requires that energy consuming products, such as motors and fans, be Energy Star of FEMP-rated. The Deputy Assistant Secretary of the Army (Installation and Housing) memorandum, dated 8 July 2010, subject: Sustainable Design and Development Policy Update (Environmental and Energy Performance) requires that FY 2013 projects and beyond achieve a 40 percent energy use reduction as compared to a building designed according to ASHRAE 90.1-2007.
- **Executive Order (EO) 13514 Federal Leadership in Environmental, Energy, and Economic Performance.** Issued in October 2009, this EO contains broad policy objectives and goals for federal agencies in the area of greenhouse gas and carbon emissions. It adds requirements in the areas of waste diversion, stormwater, and recycled and energy efficient product purchases; setting forth a goal for net zero energy Federal buildings by 2030.
- **Executive Order 13423 Strengthening Federal Environmental, Energy, and Transportation Management.** This order set forth various requirements such as increases in water efficiency, use of low VOC materials, and 50 percent recycling rates of construction waste. It also requires Federal agencies to conform to the 2006 Memorandum of Understanding, Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings.

- **Unified Facilities Criteria 3-400-01 (Energy Conservation).** This Department of Defense (DoD) construction code requires that both recovered and renewable energy be used in each building design to the maximum extent that is life cycle cost effective. It further reiterates the EISA 2007 requirement that solar hot water be used in each design to furnish a minimum of 30 percent of the hot water demand if life cycle cost effective.

- **Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings, Memorandum of Understanding, 2006.** These principles span the spectrum of construction from design to occupancy. They were once just voluntarily agreed upon by Federal agencies, however, Executive Order 13514 made them requirements for all federal construction, additions, renovations, and repairs. The major elements include:

- Validation of energy design target with actual performance in accordance with Energy Policy Act 2005.
- 20 percent reduction of indoor water usage relative to Energy Policy Act 1992.
- Daylighting factor (2 percent for 75 percent occupied space).
- Use of Low VOC Emitting Materials (adhesives, sealants, paints, carpet, furnishings).
- Recycled and bio-based content of installed materials (for EPA designated products).
- Construction waste recycling/salvage (50 percent, Army policy as well).

- **Department of Energy’s requirements for High Performance Federal Buildings.** Detailed in 10 CFR parts 433 through 436, these standards apply to all new Federal buildings and reiterate many of the previously listed sustainable design requirements as well as addressing air barrier and infiltration requirements for the building envelope.

- **US Army Corps of Engineers, Engineering and Construction Bulletin No. 2011-1.** Outlines sustainable design requirements for USACE-managed MILCON projects consistent with Army Sustainable Design Development policy. Contains more detail to aid installation planners and USACE staff implement Army goals in planning, design, and construction.

Further information on Sustainable Design can be obtained from the following:

- **Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website, www.sustainability.army.mil.** 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 websites.

- **U.S. Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website, www.cecer.army.mil**
- **Whole Building Design Guide (WBDG) Website, www.wbdg.org** – This site provides comprehensive and current information on sustainable design strategies and technologies.

Leadership in Energy and Environmental Design

The LEED® checklist for sustainability is to be used by design professionals in all new construction, additions, or renovation of Army facilities. LEED is a rating tool that offers a checklist, strategies, and scores to provide sustainable facilities. LEED allows environmentally responsible practices to be integrated into the process of facility delivery from the very beginning of the project. By using a “whole building” perspective, the LEED rating tool (See Appendix A, LEED Checklist) helps in preserving the environment and improving facility life-cycle management. LEED is based on accepted energy and environmental principles.

LEED utilizes six categories of design concerns. Points are achieved based upon the sustainable design issues addressed in the building, site and infrastructure design. Under Army policy, projects may be “self certified” by government design review personnel until FY 2013. Beginning in FY 2013, all vertical construction projects that require LEED rating must be submitted to the USGBC for official certification. LEED NC version 2.2 is currently used for those projects registered prior to 2010. It has the following certification levels:

- LEED Certified: 26 to 32 Points
- LEED Silver: 33 to 38 Points
- LEED Gold: 39 to 51 Points
- LEED Platinum: 52 to 69 Points

The newest version of LEED for new commercial buildings is LEED 2009 Building Design & Construction. Several variations of the rating system exist now for specific applications such as commercial interior renovations, retail buildings, and neighborhood development. The 2009 version contains the following certification levels:

- LEED Certified: 40 to 49 Points
- LEED Silver: 50 to 59 Points
- LEED Gold: 60 to 79 Points
- LEED Platinum: 80 and above

Sustainable Design Objectives

The objectives are design guidelines for building designers to see in new construction or modification of existing buildings. Objectives form the core principles of architectural standards on Post, and adherence to these principles will guide the appropriate visual character of built elements including:

- Adapt building designs to natural site conditions.
- Balance the desire for smaller footprint with the need to avoid adverse visual effects to historic properties.
- Design buildings in clusters to preserve land and reduce construction and maintenance costs.
- Develop a coherent architectural style that results in the blending of new and old structures. When considering historic buildings, the design shall not differentiate between the existing fabric and the new material.
- Design vertical buildings with more floors to achieve a smaller footprint and more efficient use of limited installation land areas. However, local viewsheds and airfield height restrictions must be considered.
- Combine multiple activities in one building to reduce the number of buildings required and more efficiently utilize limited installation land areas.
- Use indigenous construction materials to reduce transportation costs; select materials that can be recycled or require less energy to produce.
- Locate operable windows to maximize natural light, outward views, and, where permissible, natural ventilation.
- Consider adaptive reuse of buildings once their initial use is no longer required. Demolition of historic structures shall be considered as a last resort.
- Design main entrances of buildings to emphasize the primary means of ingress/egress. Use architectural features, landscaping, site furnishings, and lighting for such enhancements.
- Principal facades of new construction and renovations shall face the primary street or an important open space.
- Enhance the visual quality of recognized landmark structures through building renovation, improved open space character, upgraded landscaping, and improved maintenance.
- Consider building orientation on the site when possible in order to maximize energy efficiency, increase daylighting of interior spaces, and optimize glazing requirements.
- Incorporate passive solar design features where possible including overhangs, thermal mass techniques, and proper landscape placement.
- Use solar reflectance measures and materials on roofs where appropriate to reduce heat absorption and increase emissivity.

Sustainable Design Principles

The principles of sustainable design can be categorized into four broad categories for buildings addressed below with specific examples that should be considered for implementation on Fort Belvoir projects.

Water Conservation. Increasing water efficiency in our buildings is becoming more critical as supplies of fresh water are becoming strained from increasing demand. Although the Northern Virginia area, where Fort Belvoir is located, does not regularly experience supply shortages, it is located directly on the Chesapeake Bay. If potable water consumption is decreased, then the treated waste water flows into the Bay are subsequently reduced. In addition, there is a large electric demand associated with the treatment plants and pumps required to deliver potable water to the customer and then transport and treat the waste water. Maximizing credits in the water efficiency category of the LEED rating system is Army policy.

Energy Conservation. Buildings consume the largest portion of the energy budget at Fort Belvoir. As energy costs continue to rise and energy demands for new building systems, including computers and high tech equipment, continue to increase, the Army has made energy conservation a top priority at every installation. The energy performance of a building starts with its basic design. Its massing and orientation, materials, construction methods, and building envelope provide the foundation for energy efficiency. The heating, ventilation, and air conditioning (HVAC) and lighting systems can then be selected to complement the basic design and optimize how the building uses energy. Per Army policy, major consideration must be given to renewable energy sources such as ground source heat pumps for building heating and cooling, photovoltaic cells for electric generation, solar technologies for hot water heating, and passive solar features.

Passive solar design elements shall be considered at the conceptual phase of the design. The buildings' orientation, shading with overhangs, and glazing strategies in conjunction with thermal mass sections provide substantial energy efficiency upgrades for little cost. Cool roof or green roof technologies offer the design team the opportunity to increase energy efficiency and earn several credits in the LEED category. Vegetated green roofs also have the additional benefit of reducing stormwater runoff and possibly reducing the cost and size of engineered stormwater controls, thereby conserving valuable buildable land.



Green roofs, such as those at the Fort Belvoir Community Hospital, can reduce utility costs when used properly and provide visual interest for building occupants.

Life-cycle cost analyses (LCCA) for the HVAC system and other major energy conserving components such as roofing systems and on-site electrical generation systems, shall be conducted early in the process but no later than the 30 percent design stage. LCCAs for HVAC systems shall compare at least three alternatives beginning with conventional high efficiency systems and using successively more efficient alternatives, such as geothermal systems. All LCCAs shall utilize study periods of 40 years based on Department of Energy and Army regulations. A final LCCA of recommended design elements analyzed in combination with one another should be prepared to confirm and further clarify results at the 60 percent design stage. LCCAs must be performed in accordance with standards outlined in 10 CFR part 436.

Measurement and verification of energy savings is critical to ensuring the success of the efforts during the design phase. The Enhanced Commissioning credit under the LEED® rating system is required by Army Policy for Corps of Engineers-managed MILCON projects beginning in FY 2011. Federal law also requires meters to be installed for the major resource inputs such as electricity, natural gas, and water. Fort Belvoir maintains an Energy Monitoring System (EMS), and new equipment must be specified to be compatible with existing equipment.



Green roofs, such as those installed at NGA, can provide added insulation for the building, reducing interior heat in the summer and retaining heat in the winter.

Material Selection and Waste Reduction. The materials selected in construction play a large part in ensuring a sustainable process and that the finished building provides a healthy atmosphere for its occupants. Since constructing a building involves large amounts of waste, careful consideration must be given to the materials used in order to reduce the amount of waste generated during a project. Army policy requires that 50 percent of the construction waste must be recycled. This reduces our need for more land for future landfills. Federal law mandates that certain percentage of building products contain recycled content and adhering to these requirements gains credits in the LEED® system as well. Selecting materials with recycled content or those from rapidly renewable resources will slow the demand for virgin material from non-renewable sources. Equipment specified during the design phase will have impacts during the life of the building.

Indoor Environmental Quality. Due to the fact that most employees at Fort Belvoir spend most of their working day inside, it is critical that we design and build healthy indoor environments. Mechanical ventilation and material selections are critical to ensuring healthy indoor air quality. Additional ventilation above standard building code may allow the designers to implement heat recovery technologies to offset the additional heating and cooling loads. Selection of low VOC construction products and low VOC finishes will help ensure better indoor air quality for employees from the very start of occupancy by reducing the off-gassing properties of traditional materials.

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Circulation Design Standards

4

Introduction

Purpose

The visual image and functionality of an installation is greatly determined by the design and location of its roadways, walkways, entrances, and parking lots. Because these elements use considerable amounts of land, they are a dominant feature on any installation. Additionally, the circulation system provides a primary vantage point from which the installation is viewed. Safe and efficient vehicular movement results in better orientation, and contributes to the development of a positive environment for installation personnel and visitors.

This chapter discusses the details of circulation design and its implications to Fort Belvoir. The design standards are used to assess the circulation elements of the Installation, as well as to identify the specific characteristics that provide visual unity to Fort Belvoir.



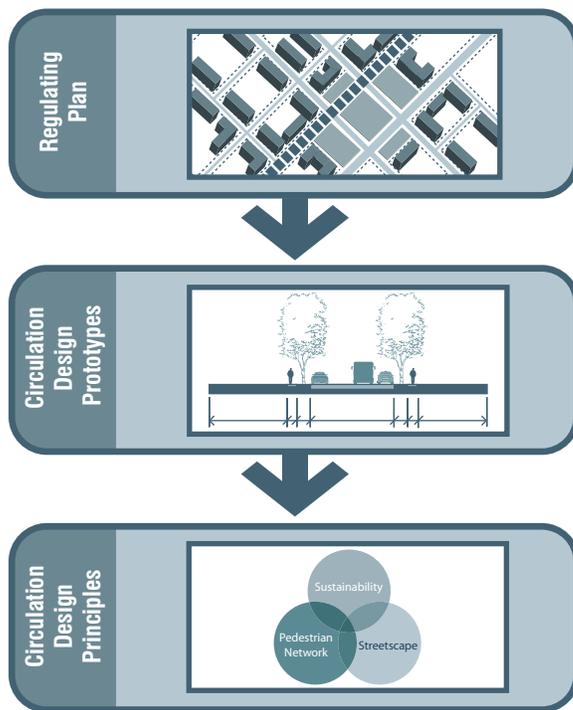


Figure 4.1: Circulation Design Standards Process

How to Use the Standards

This chapter offers design guidance for Fort Belvoir’s circulation system including roadway hierarchy and types, intersections, trails, and parking. It is divided into four sections that address separate topics, but comprise components that interweave to form a congruent transportation network. The sections are as follows:

- **Street Prototype Standards:** represent the types of roadways present on Fort Belvoir separated by hierarchy, traffic function, and volume. The template depicts each roadway by type, overall character, and appearance of the road. Where appropriate, the prototypes include on-street bicycle lanes.
- **Intersection Prototype Standards:** occur where traffic circulation flows intermix and reflect the road hierarchy. Standards for these prototypes include street and crosswalk dimensions, corner radii, and planting strip dimensions.
- **Off-Road Multi-Purpose Trail Standards:** include recreational bikeways, running trails and walkways not associated with streets.
- **Parking Standards:** depict the location, design, type, and landscape treatment of parking areas on the Installation.

Guidance in this chapter is provided in three easy steps which lead into the following chapters of the IPS:

- Refer to the Regulating Plan (see Chapter 2) or Figure 4.2 - Circulation Regulating Plan and determine the type of street, intersection, trail, or parking area that is in question.
- Refer to the appropriate street, intersection, trail, or parking area pages in this chapter which provides specific design details. The page outlines the dimensions of each component of the transportation network, their interactions, and where necessary, their separations.
- Refer to Circulation Design Principles, which are strategies and requirements that need consideration for any new construction or roadway improvements.
- Refer to the Landscape Design Standards (see Chapter 5) for the recommended landscape treatment for use in planting strips, medians, parking areas, and public spaces.
- Refer to the Site Elements Design Standards (see Chapter 6) for the recommended site furnishings associated with each streetscape, trail, and public spaces.

Circulation Objectives

The ultimate goal is to establish a sustainable circulation system on Post that promotes aesthetic appeal, environmental preservation, and energy conservation, while simultaneously providing safe and efficient circulation. To achieve this, these objectives should be followed:

- Provide a circulation system that meets anti-terrorism and security requirements, while enhancing public health and safety.
- Include all forms of vehicular and pedestrian traffic.
- Develop a hierarchy of circulation within the system.
- Provide an efficient and safe vehicular circulation system.
- Ensure system positively contributes to the visual image of the Post.
- Adapt the circulation system to natural site conditions on the Post, by utilizing the framework plan that reinforces grid patterns on plateau areas and curvilinear alignments in sloping terrain.
- Improve and expand the present trail/bike path system by linking neighborhoods with schools, recreational areas, and points of interest on Post.
- Develop walking/jogging paths to link urbanized and natural areas on Post, while taking advantage of important views or vistas.
- Reinforce the desired character of the street with properly selected lighting, signage, furnishings, and planting.
- Promote maintenance and repair of existing and proposed circulation systems.
- Ensure that entrance gates: complement the architectural styles on Post, establish a positive visual impression and sense of entry, provide a smooth transition between different spaces and functions, and meet AT/FP standards.

Street Prototype Standards

This section outlines the different typologies of streets by designating the hierarchy of circulation based on roadway function and access characteristics as follows:

- **Movement:** characterizes the type of access provided. Free/Circulatory designates a travel route less inhibited by intersections and provides a means for the greatest number of vehicles to move between major destination areas. Slow/Access designates a travel route that has more intersections and provides direct access to specific destination points.
- **Design Speed:** designates the maximum speed allowed in terms of miles per hour (mph).
- **Off-Street Parking Frontage:** designates if surface parking lots or structure parking garages are allowed to abut the right-of-way.

- **Bike Lane:** dictates if travel lanes specifically meant for bicycle travel are to be separated from the road or to be included within the vehicle travel path as a shared lane.
- **Curb Type:** prescribed pavement edge that may entail a raised curb with associated gutter that captures runoff and diverts it to specific areas, or a swale that entails no raised curbing and captures runoff along the entire length of pavement.

Street Design Principles

Fort Belvoir has an existing street network based on an orthogonal grid that is orderly and predictable. The grid is most prevalent on the plateaus areas on the installation where terrain is level and permits a structured geometry to occur. Toward the periphery of the installation, where terrain is more sloped, the streets become more curvilinear. In order to preserve the existing street network and improve upon it, design standards should consider:

- Matching the existing street network configurations and street widths wherever possible.
- Making logical connections that ensure a complete street network is created with minimal dead-ends.
- Ensure that the size of blocks is suitable for the intended functions be they commercial, administrative, industrial, residential, or mixed use. The more pedestrian-oriented the area, the smaller the block should be.
- Very large blocks shall be avoided unless mission requirements mandate a single parcel of land. In which case, pedestrian circulation networks should be overlain on the block to provide adequate access.
- Ensure a primary roadway loop around the Main Post that accommodates the majority of vehicular circulation.
- Provide additional east-west connections between Belvoir and Gunston Roads to enhance the grid network of streets.



Beauregard Road connects to several tertiary roads to form a grid on North Post.

Street Hierarchy

The street hierarchy reflects the functional and visual structure of circulation. Each type of street shall convey its role and function within the overall network. Streets should incorporate as much functionality to various circulation patterns as possible to accommodate vehicles, bicycles, and pedestrians. Transit systems may also be incorporated as part of the overall functionality. Figure 4.2 classifies the hierarchy of the roads on Fort Belvoir. This section provides details about the following road types:

- Primary Road I: Parkway
- Primary Road II: Boulevard
- Secondary Road I: Avenue
- Secondary Road II: Street
- Tertiary Road

Street prototypes utilize basic elements which are defined below, and vary in character based on road hierarchy.

- Right-of-Way (ROW): a strip of land granted for circulation of vehicles and pedestrians. Width of the ROW varies according to the type or road and includes planting areas for street trees.
- Sidewalks: a paved way specifically for pedestrian circulation. Usually parallel to travel lanes to allow similar degree of access while maintaining separation from vehicles. Varies in width depending on hierarchy.
- Planting Strip or Tree Boxes: A continuous planted strip of land (planting strip) or segmented planted areas (Tree Boxes) usually between vehicle travel lanes and sidewalks. Used as a means of separating people from traffic, and for street trees and other vegetation. Low-impact development strategies to manage stormwater runoff can be implemented in this area.
- On-Street parking: strip of pavement on the right side of the travel lane designated for car parking.
- Dedicated Bicycle Lane: a paved way specifically for bicycle circulation. Usually a designated in conjunction with travel lanes but demarcated with painted stripes and/or symbols. On smaller street types, may share the same travel lanes with vehicles.
- Travel Lanes: a paved way specifically for vehicle circulation. Number and width of lanes varies depending on road type.
- Center Median/ Turn Lane: Either a paved way designated for left-turning vehicles, or an area for vegetation such as street trees and lawn. May be permitted depending on road type.

Table 4.1: Circulation Design Specifications

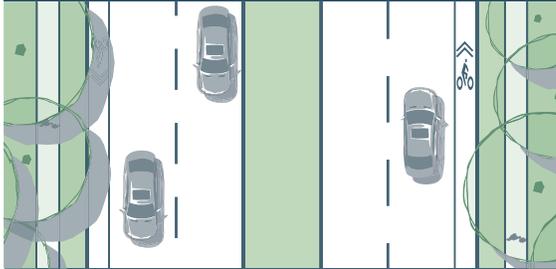
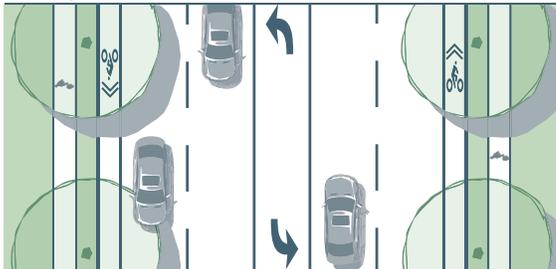
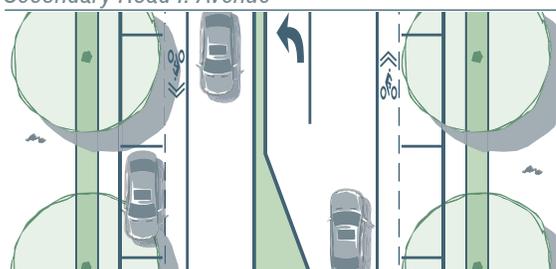
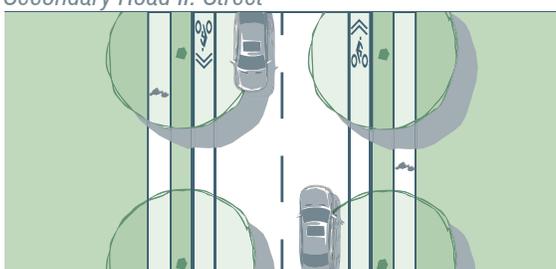
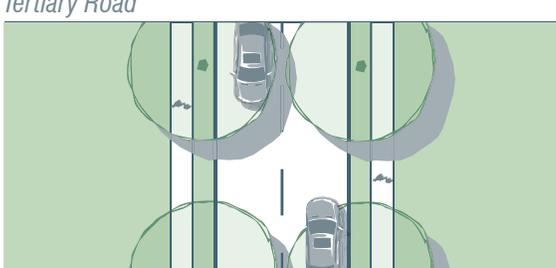
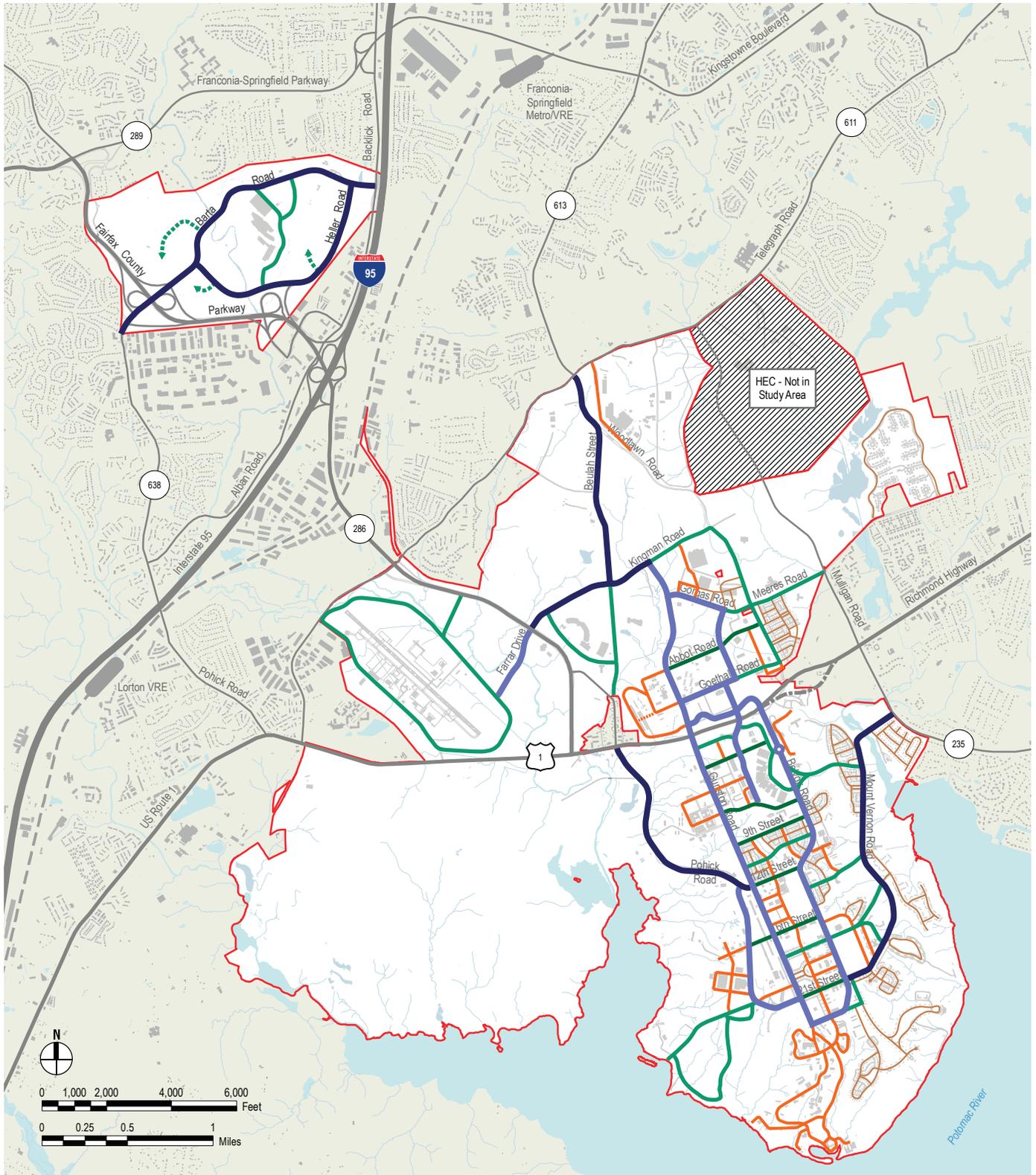
	Movement	Design Speed	Off-Street Parking Frontage	Bike Lane	Curb Type
<p><i>Primary Road I: Parkway</i></p> 	Free / Circulatory	35-45 mph	Prohibited	Separated Lanes	Swale or Curb and Gutter
<p><i>Primary Road II: Boulevard</i></p> 	Free / Circulatory	25-35 mph	Prohibited	Separated Lanes	Curb and Gutter
<p><i>Secondary Road I: Avenue</i></p> 	Slow / Access	15-25 mph	Permitted	Separated Lanes	Curb and Gutter
<p><i>Secondary Road II: Street</i></p> 	Slow / Access	15-25 mph	Permitted	Separated or Shared Lanes	Curb and Gutter or Swale
<p><i>Tertiary Road</i></p> 	Slow / Access	10-20 mph	Permitted	Shared Lanes	Curb and Gutter or Swale

Figure 4.2: Circulation Regulating Plan



- | | | | | | |
|--|----------------------------|--|---------------------------|--|--|
| | Primary Road I: Parkway | | Secondary Road I: Avenue | | Tertiary Road |
| | Primary Road II: Boulevard | | Secondary Road II: Street | | Residential Roads
(guidance not given in this document) |

Primary Road I: Parkway

Design Specifications

	Overall Widths	Minimum	Maximum
A	Right-of-Way (ROW)	50'	160'
B	Sidewalks - required	4'	8'
C	Planting Strip - required	5'	No Max.
	On-Street Parking - prohibited	NA	NA
D	Dedicated Bicycle Lane - required	5'	8'
E	Travel Lanes - 2 lanes min. - 4 lanes max. in each direction	12'	15'
F	Center Median and/or Turn Lane - permitted	4'	15'

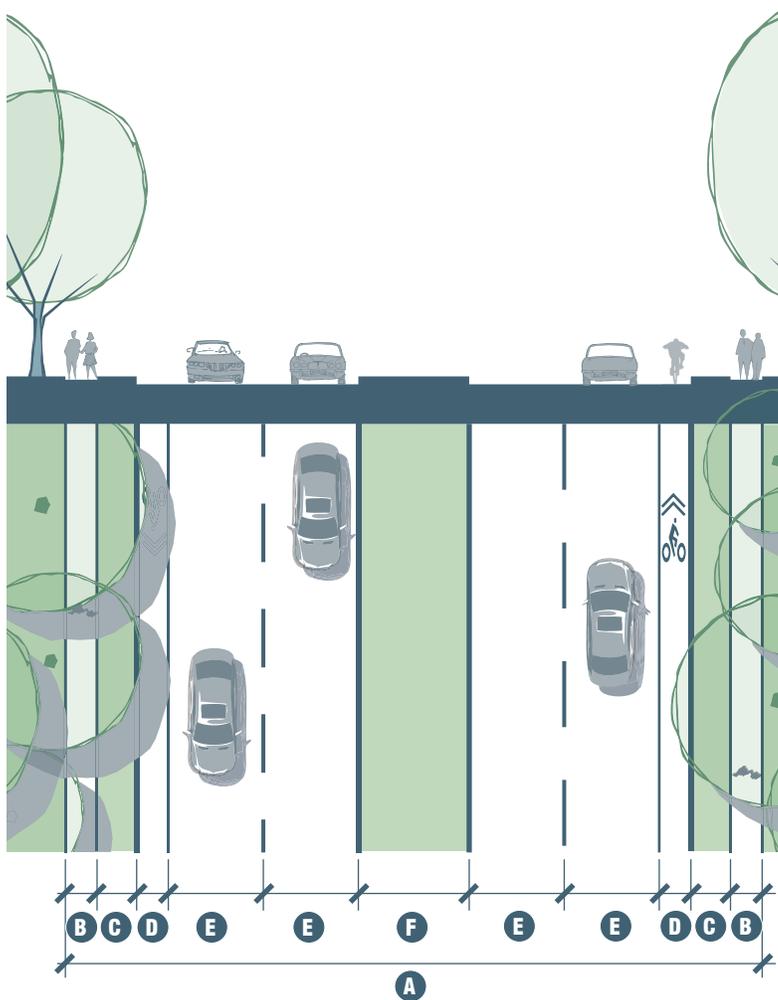


Figure 4.3: Primary Road I: Parkway Section/Plan

Parkways provide primary means of ingress and egress to the Installation. Their scenic qualities are derived from the naturalized setting these parkways traverse (Figure 4.3). The parkways on Fort Belvoir are continuous roads with large radii that conform to the topography. They are generally curvilinear in nature and are located at the perimeters of the Installation, apart from urban centers. The parkways handle heavy traffic volumes ingressing and egressing the Post. The parkways on-Post include: Pohick Road, John J. Kingman Road, Mount Vernon Road, Beulah Street, Barta Road, and Heller Road.



John J. Kingman Road



Mount Vernon Road

Primary Road II: Boulevard

Design Specifications

The boulevard is an interior Post circulating road that serves as the principal connector road between destination points, and between North and South Post. Roads are typically straight and conform to the grid network of streets. The boulevards handle moderate to heavy traffic as they are primary circulators on Post. Roads include: Gunston Road, Belvoir Road, West Road, 23rd Street, and Theote Road.



Gunston Road



Belvoir Road

	Overall Widths	Minimum	Maximum
A	Right-of-Way (ROW)	45'	140'
B	Sidewalks - required	4'	8'
C	Planting Strip - required	4'	10'
	On-Street Parking - prohibited	NA	NA
D	Dedicated Bicycle Lane - required	5'	8'
E	Travel Lanes - 2 lanes min.- 4 lanes max. in each direction	12'	15'
F	Center Median and/or Turn Lane - permitted, but not required.	10'	12'

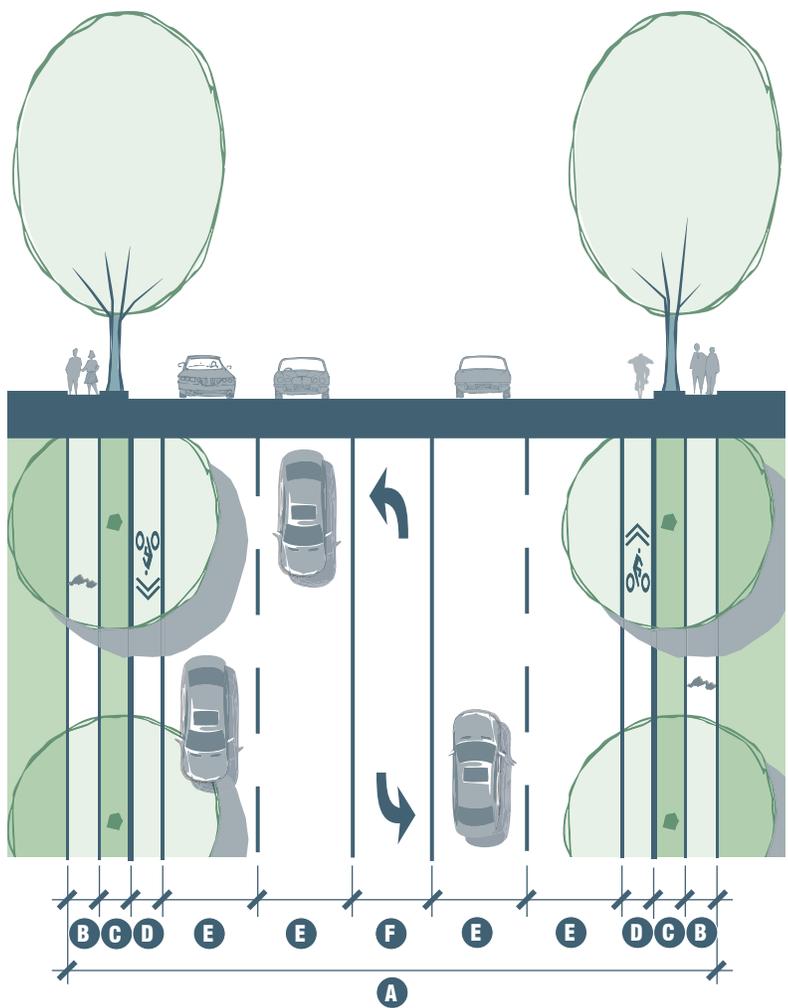


Figure 4.4: Primary Road II: Boulevard Section/Plan

Secondary Road I: Avenue

Design Specifications

	Overall Widths	Minimum	Maximum
A	Right-of-Way (ROW)	40'	130'
B	Sidewalks - required	4'	15'
C	Planting Strip or Tree Boxes - required	4'	No Max.
D	On-Street Parking - permitted	4'	6'
E	Dedicated Bicycle Lane - permitted	4'	5'
F	Travel Lanes - 2 lanes min.- 4 lanes max. in each direction	11'	15'
G	Center Median and/or Turn Lane - permitted, but not required.	10'	12'

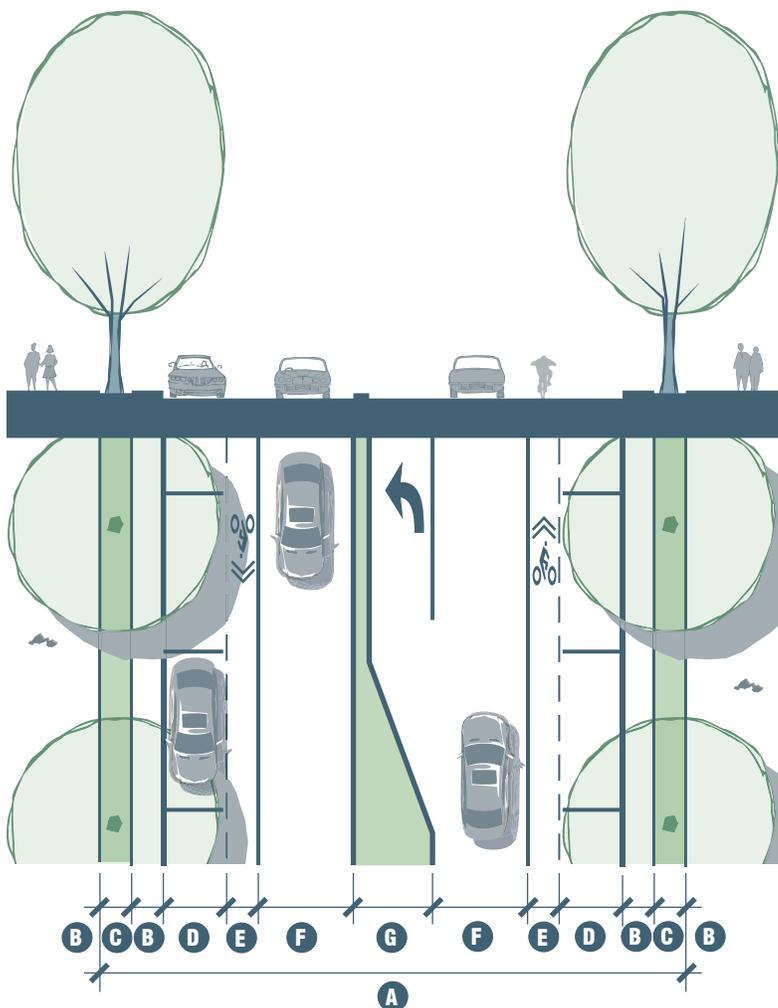


Figure 4.5: Secondary Road I: Avenue Section/Plan

Avenues are secondary roads providing east-west connectivity through the Urban Core (see Figure 4.5). Roads may have dedicated bike lanes or they may be considered a “sharrow,” where bikes ride within the same lane as vehicles. In the case of a sharrow where a separate bike lane is not provided, the travel lane should be designed at the maximum width to allow the greatest amount of space for vehicles passing the bicycle. Streets are typically short, straight, and divided by a median for landscaping or turning. They provide direct access to facilities and parking. Traffic volumes range from light to heavy. Avenues include: Abbot Road, Third Street, Sixth Street, Ninth Street, 12th Street, 16th Street, and 21st Street.



12th Street



Ninth Street

Secondary Road II: Streets

Design Specifications

Streets serve as connectors between primary and tertiary roads and typically connect primary roads to abutting properties. These roads are identified on Figure 4.2, Road Hierarchy Regulating Plan. Roads may have dedicated bike lanes or they may be considered a “sharrow,” where bikes ride within the same lane as vehicles. In the case of a sharrow where a separate bike lane is not provided, the travel lane should be designed at the maximum width to allow the greatest amount of space for vehicles passing the bicycle. Secondary streets maintain continuous through-traffic at moderate to slow speeds, with one moving lane in each direction (Figure 4.6). Traffic volumes are generally light to moderate. They can be either straight or curvilinear based upon topography and land patterns. Streets on Fort Belvoir include: First Street, 18th Street, Warren Road, Burbeck Road, Willis Road, and Britten Drive as examples.

	Overall Widths	Minimum	Maximum
A	Right-of-Way (ROW)	40'	80'
B	Sidewalks - required on one side only	4'	8'
C	Planting Strip or Tree Boxes- required	4'	15'
	On-Street Parking - prohibited	NA	NA
D	Dedicated Bike Lane - permitted	4'	5'
E	Travel Lanes - 2 lanes max. in each direction	11'	15'
	Center Median and/or Turn Lane - prohibited	NA	NA



First Street



Gillespie Road

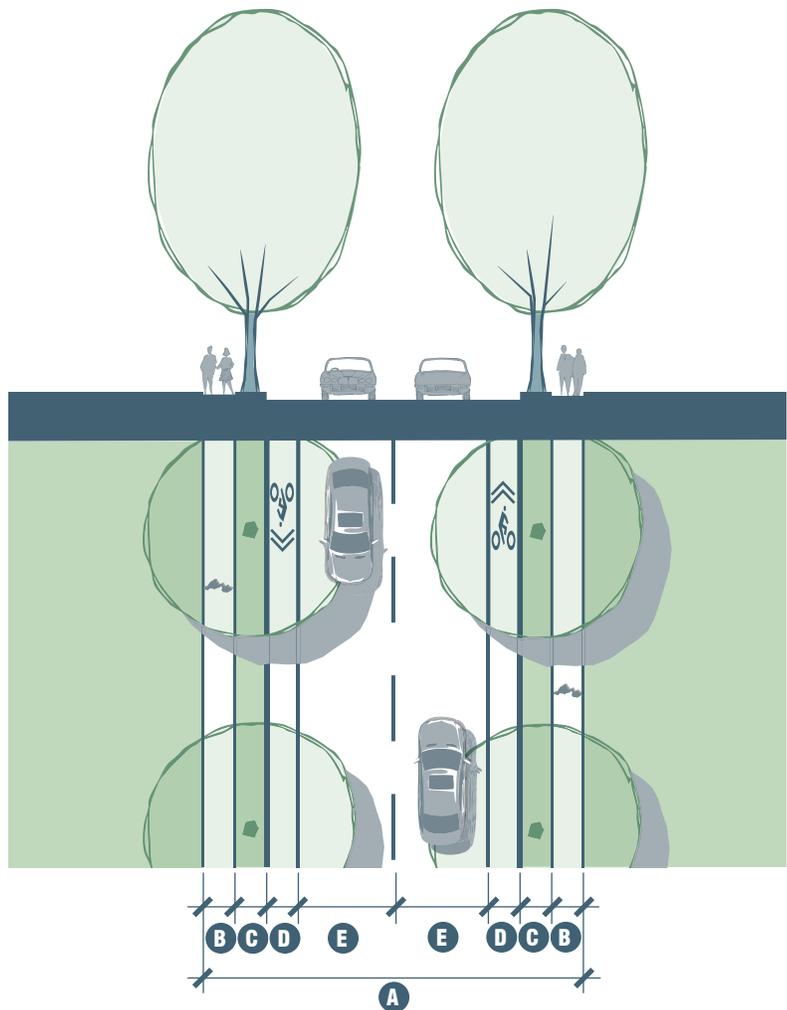


Figure 4.6: Secondary Road II: Streets Section/Plan

Tertiary Roads

Design Specifications

	Overall Widths	Minimum	Maximum
A	Right-of-Way (ROW)	30'	100'
B	Sidewalks - permitted	4'	8'
C	Planting Strip or Tree Boxes - permitted	4'	8'
	On-Street Parking - permitted	8'	9'
	Dedicated Bicycle Lane - permitted	4'	5'
D	Travel Lanes - 2 lanes max. in each direction	11'	15'
	Center Median and/or Turn Lane - prohibited	NA	NA

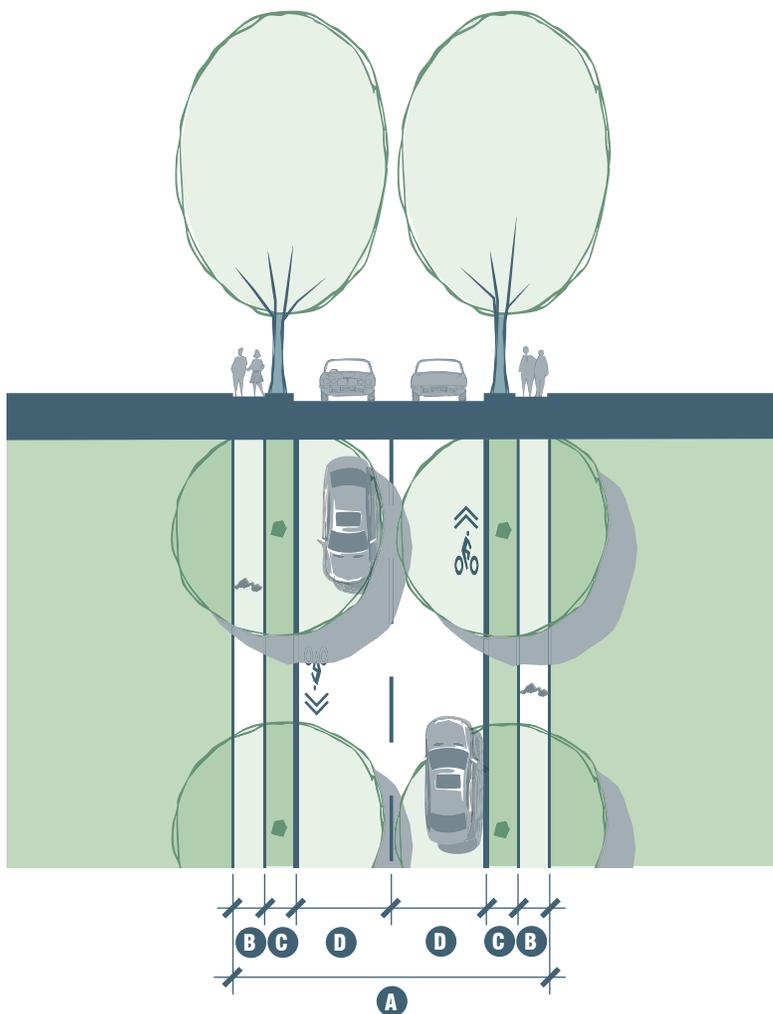


Figure 4.7: Tertiary Road Section/Plan

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 (Figure 4.7). Roads may have dedicated bike lanes or they may be considered a “sharrow,” where bikes ride within the same lane as vehicles. In the case of a sharrow where a separate bike lane is not provided, the travel lane should be designed at the maximum width to allow the greatest amount of space for vehicles passing the bicycle. Tertiary roads on Fort Belvoir are identified on Figure 4.2, Circulation Regulating Plan. They are relatively short, straight or curvilinear to reinforce surrounding topography and land use. They also include roads within the residential areas. Roads on Fort Belvoir include: Fifth Street, Flagler Road, Middleton Road, 13th Street, 14th Street, 15th Street, and Loop Road as examples.



Residential Street



Flagler Road

Intersection Standards

Intersections occur at points where traffic circulation flows converge. These must be designed for safety and ease of traffic movement. Additionally, the road hierarchy (Figure 4.2) on Fort Belvoir greatly influences the design of intersections. For example, requirements for turning radii and crosswalk treatments vary by typology, which impact the design. These requirements are detailed in Table 4.2. Design techniques recommended to plan or improve intersections include:

- All roadways shall intersect at right angles (90 degrees), although 85-95 degrees is acceptable.
- Avoid offset intersections or dangerous, complex intersections involving more than two streets.
- Eliminate intersections in proximity to one another. The minimum distance between intersections shall be 30 meters (100 feet).
- Use T-intersections at points where a tertiary road intersects with a secondary/primary road, to reduce conflict and promote safety.
- Minimize intersections along primary roads to reduce points of conflict and increase safety.
- Include adequate sight distances to meet minimum standard requirements at all intersections. These distances will vary with roadway speed limits. For example, the point a driver waits to cross/enter a traffic lane to a point 90 feet down the center-line (to the right and to the left) forms a sight triangle for 20 miles per hour .
- Minimize pedestrian and bicycle intersections with

primary roads.

- 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.
- Create local service drives or access roads that parallel highways and primary roads. This provides users access to properties and eliminates direct curb cuts from the main road to each individual property.
- Intersections between a 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 a clear line of sight down the tracks.

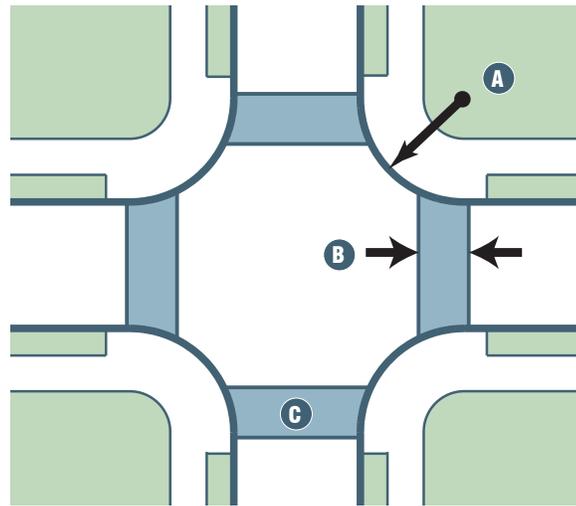


Figure 4.8: Typical Intersection

Table 4.2: Road Hierarchy Intersection Design Specifications Matrix

Roadway Type	Primary Road I: Parkway	Primary Road II: Boulevard	Secondary Road I: Avenue	Secondary Road II: Street	Tertiary Road
Primary Road I: Parkway	A Curb radii: >40'	Curb radii: >40'	Curb radii: 40'	Curb radii: 40'	Curb radii: 40'
	B Crosswalk width: 10'	Crosswalk width: 10'	Crosswalk width: 10'	Crosswalk width: 10'	Crosswalk width: 10'
	C Crosswalk material: Painted	Crosswalk material: Painted or Pavers	Crosswalk material: Painted or Pavers	Crosswalk material: Painted	Crosswalk material: Painted
Primary Road II: Boulevard	A Curb radii: 40'	Curb radii: 30-40'	Curb radii: 20-40'	Curb radii: 20-40'	Curb radii: 20-40'
	B Crosswalk width: 9'	Crosswalk width: 9'	Crosswalk width: 9'	Crosswalk width: 9'	Crosswalk width: 9'
	C Crosswalk material: Painted or Pavers	Crosswalk material: Painted or Pavers			
Secondary Road I: Avenue	A Curb radii: 20-40'	Curb radii: 20-40'	Curb radii: 20-30'	Curb radii: 20-30'	Curb radii: 10-30'
	B Crosswalk width: 9'	Crosswalk width: 9'	Crosswalk width: 9'	Crosswalk width: 9'	Crosswalk width: 9'
	C Crosswalk material: Painted or Pavers	Crosswalk material: Painted or Pavers			
Secondary Road II: Street	A Curb radii: 20-30'	Curb radii: 20-30'	Curb radii: 10-30'	Curb radii: 10-30'	Curb radii: 10-30'
	B Crosswalk width: 8'	Crosswalk width: 8'	Crosswalk width: 8'	Crosswalk width: 8'	Crosswalk width: 8'
	C Crosswalk material: Painted	Crosswalk material: Painted	Crosswalk material: Painted	Crosswalk material: Painted	Crosswalk material: Painted
Tertiary Road	A Curb radii: 10-20'	Curb radii: 10-20'	Curb radii: 10-20'	Curb radii: 10-20'	Curb radii: 10-20'
	B Crosswalk width: 8'	Crosswalk width: 8'	Crosswalk width: 8'	Crosswalk width: 8'	Crosswalk width: 8'
	C Crosswalk material: Painted	Crosswalk material: Painted	Crosswalk material: Painted	Crosswalk material: Painted	Crosswalk material: Painted

Parking Standards

Parking Requirements

The total quantity of parking in any one location will vary with the needs of the facility (Table 4.4) and parking allowances authorized. The following are general considerations for parking requirements.

- All parking lots shall 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 4.3.
- For initial planning and programming, allocate 400 square feet of parking lot area per car. This 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.

Table 4.3: Required Minimum Number of Accessible Parking Spaces

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

Source: Army Technical Instruction 800-01, 20 July 1998



Planting islands and swales can divide large parking areas, provide stormwater filtration, and shade for pedestrians and vehicles.

- Minimize parking space requirements of a facility by selecting a site that will allow the sharing of parking with related activities.
- 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 by conforming more to the natural topography). Parking islands shall be spaced according to the Parking Prototypes standards in this chapter.
- 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.
- Promote means of access other than vehicular by providing alternative means of access, such as walkways and bikeways.
- Incorporate efficiency into the design and placement of access drives and parking spaces. All drives providing direct access to parking spaces shall provide spaces on both sides of the drive.
- Use natural topography and existing trees to visually screen parking areas from adjacent facilities and other parking bays.
- Use pervious pavers and low-impact design for runoff retention and filtration whenever conditions permit.
- Encourage the construction of parking structures that provide a number of benefits including efficient land use, reduced visual impact, protection of vehicles from inclement weather, and reduced stormwater management requirements versus surface lots.
- Parking Area Design Guide. This comprehensive guide addresses siting, parking area types, geometry (parallel, perpendicular, angled), access, and maintenance consideration. It can be accessed at the following website: http://www.army.mil/usapa/eng/DR_pubs/dr_a/pdf/tm5_803_13.pdf, Parking Areas.
- Observe the anti-terrorism Setback Requirements in the design and placement of parking lots and structures.
- The creation of new temporary parking lots is not permitted unless the need is related to adjacent new construction or renovations. The project requiring the lot creation must also provide the remediation for its removal once construction or renovation is completed. Any existing temporary parking areas shall be converted to permanent lots or removed, based on a parking assessment and available funding.

Table 4.4: Parking Requirements

Facility	Number of Parking Spaces
Administration, Headquarters and Office Buildings	60% of assigned personnel
Bakeries	38% of civilian employees, largest shift
Bank and Credit Union (when not included in a community shopping center)	2% of authorized customers served
Cafeteria, Civilian (when not included in a community shopping center)	15% of seating capacity
Central Food Preparation Facilities	38% of military and civilian food service operating personnel, largest shift
Chapels	30% of seating capacity
Child Development Centers	8% of children, 80% of staff
Commissary Stores, Food Sales (when not included in a community shopping center)	2.5% of authorized customers served
Community Shopping Center (including such elements as Main Exchange, Miscellaneous Shop, Restaurant, Commissary Stores, Food Sales, Bank, Theater, Post Office)	4% of authorized customers served
Enlisted Personnel Dining Facilities, for: Basic and Recruit Training, Advanced Individual Training, Service Schools, Recruit Reception Stations	38% of military and civilian food service operating personnel, largest shift
Permanent Party, Garrison (including Army Table of Organization and Equipment [TOE] and Table of Distribution and Allowances [TDA] units, Support Units, Construction Battalions, Weapon Plants, Personnel Transfer and Overseas Processing Centers	38% of military and civilian food service operating personnel, largest shift, plus 8% of enlisted personnel (patron parking) to be served during a meal period
Exchanges, Main (when not included in a community shopping center)	2.5% of authorized customers served
Family Housing	2 spaces per living unit
Field House (combined with Football and Baseball Facilities)	1% of military strength served
Fire Station: Two-Company	7 spaces
Fire Station: One-Company	10 spaces
Guard Houses, Military Police Stations	30% of guard and staff strength
Physical Fitness Center (if the only one at an Army installation)	1% of military strength served
Physical Fitness Center Area (regimental)	10 spaces
Laundries and Dry Cleaning Plants	38% of civilian employees, largest shift
Libraries: Central	1 space for each 500 SF (46.m2) gross area of floor area
Libraries: Branch	8 spaces
Vehicle Maintenance Shops	38% of civilian employees, largest shift
Schools, Dependent (without Auditorium)	2 spaces per classroom
Schools, Dependent (with Auditorium)	2 spaces per classroom, plus 15% of auditorium seats
Service Clubs	2% of enlisted personnel or officer strength served
Swimming Pools	20% of design capacity of the swimming pool
Temporary Lodging Facilities	100% of bedrooms
Theaters (when not included in a community shopping center)	25% of seating capacity
Unaccompanied Enlisted Personnel Housing	70% of design capacity
Unaccompanied Officers Personnel Housing	100% of living suites
Warehouses	1 space for each 500 SF (46.5m2) gross area of office area, plus 1 space for 4 persons assigned to storage activities

Source: Army Technical Instruction 800-01, 20 July 1998



90° off-street parking at the OCAR facility.



60° off-street parking along 23rd Street.



45° off-street parking south of the Home and Garden Center.



Pervious pavers in parking lots can provide additional stormwater drainage and filtration.

Parking Prototypes

This section discusses the prototypical parking configurations found on Fort Belvoir. They are divided into two categories: off-street parking and on-street parking. Each diagram and table provides the recommended standards that shall be followed when designing surface parking areas.

Off-Street Parking

Parking lots are comprised of typical module configurations that consist of a central drive-aisle and parking stalls on both sides (Table 4.5). The 90 degree module requires the largest width, but is often the easiest for users to maneuver. Because of this maneuverability, 90 degree parking is preferred where space permits. As parking stall angles decrease to 60 and 45 degrees, the modules become progressively narrower. However, the efficiency, which refers to the required square footage per space, reduces as the parking angle decreases.

Table 4.5: Off-Street Parking Prototypes

90 degree Off-street Parking

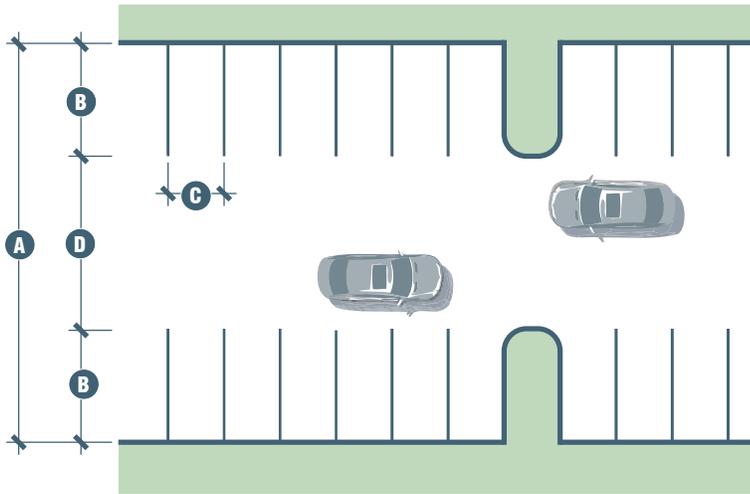


Figure ID	Overall Width	Minimum	Maximum
A	Parking Bay	60'	72'
B	Vehicle Projection	18'	20'
C	Stall Width	8.5'	10'
D	Drive Aisle Width	20'	24'

Parking Specifications

- Drive-aisle is two-way.
- It provides the most efficient use of space (375 sf per vehicle).
- Parking stalls shall not exceed 10 continuous stalls without an island.
- Typical compact car parking stall: 8.5' x 18'.
- Typical large car parking stall: 10' x 20'.
- Typical handicap parking stall: 13' x 18'.

60 degree Off-street Parking

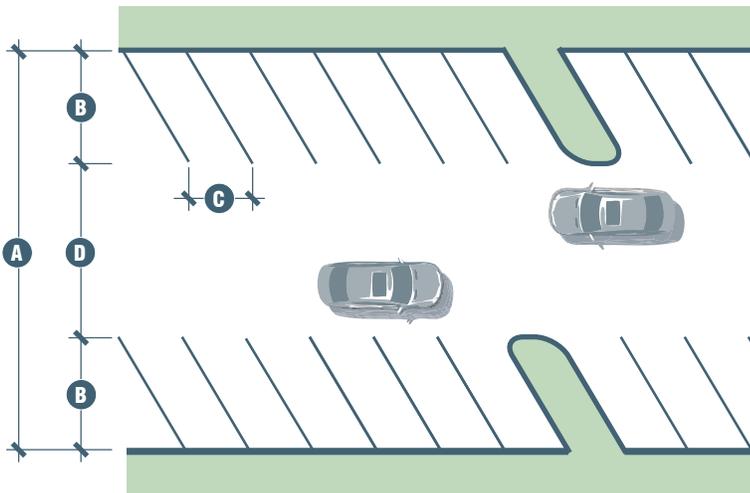


Figure ID	Overall Width	Minimum	Maximum
A	Parking Bay	53'	64'
B	Vehicle Projection	19'	22'
C	Stall Width	9.83'	11.5'
D	Drive Aisle Width	20'	24'

Parking Specifications

- Drive-aisle can be either two-way or one-way.
- It provides moderate use of space (375 - 425 sf per vehicle).
- Parking stalls shall not exceed 10 continuous stalls without an island.
- Typical compact car parking stall: 9.83' x 19'.
- Typical large car parking stall: 11.5' x 22'.
- Typical handicap parking stall: 14' x 20'.

45 degree Off-street Parking

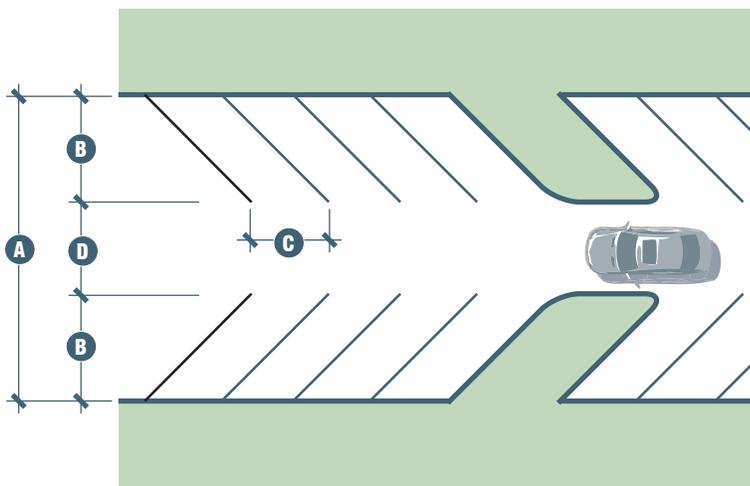


Figure ID	Overall Width	Minimum	Maximum
A	Parking Bay	42'	48'
B	Vehicle Projection	17.66'	20'
C	Stall Width	12'	14'
D	Drive Aisle Width	12'	15'

Parking Specifications

- Drive-aisle is one-way.
- It provides minimum efficient use of space (525 sf per vehicle).
- Parking stalls shall not exceed 10 continuous stalls without an island.
- Typical compact car parking stall: 12' x 17.66'.
- Typical large car parking stall: 14' x 20'.
- Typical handicap parking stall: 15' x 19'.



12th Street Parallel Parking

On-Street Parking

On-street parking is only permitted on streets where the circulation hierarchy and design speed allow the maneuverability for parking a car. Its primary function is to provide additional parking outside of centralized parking lots and to permit closer access to facilities. Three configurations occur on Post and include: 90 degree, 45 degree, and parallel. Parallel parking is permitted on both sides of the street, especially in urban areas, where parked cars can act as a buffer between the street and sidewalk. The 90 degree and 45 degree parking are permitted only on one side of a street, as exiting these spaces is cumbersome and precarious.



Flagler Road 90° Parking



13th Street 45° On-Street Parking

Table 4.6: On-Street Parking Prototypes

Parallel On-street Parking

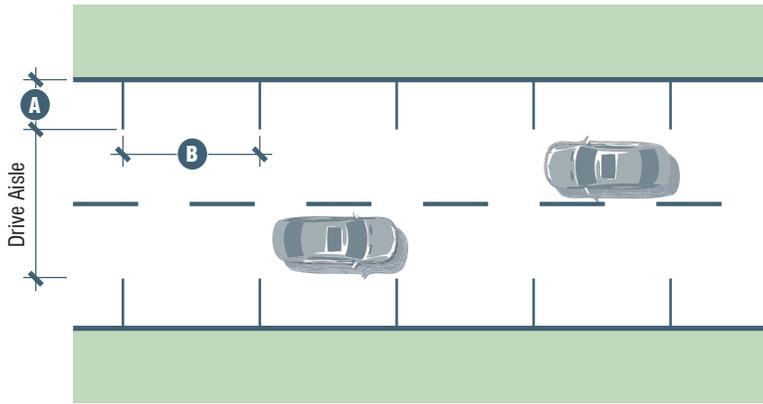


Figure ID	Overall Width	Minimum	Maximum
A	Vehicle Projection	18'	22'
B	Stall Width	8'	9'

Parking Specifications

- Recommended for locations where street width must be kept to a minimum.
- Allowed on both sides of the road where road width is adequate to support.
- Visibility is good; maneuvering is moderately easy.
- Use this module in parking areas that have a moderate to high turnover rate.
- Space requirement is typically 176 sf.
- Typical parking stall dimensions: 8' x 22'.

90 degree On-street Parking

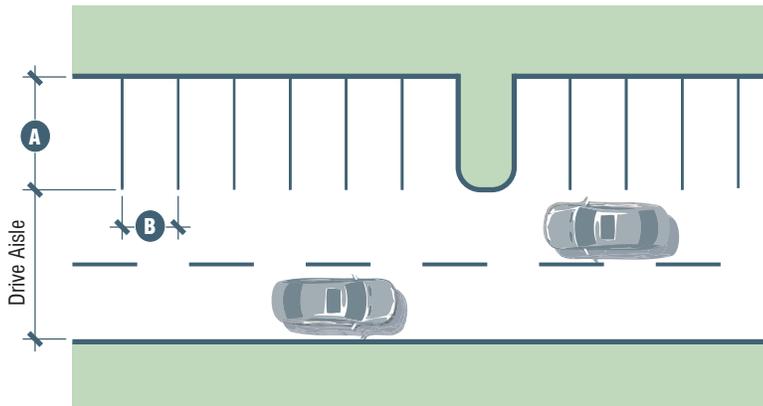


Figure ID	Overall Width	Minimum	Maximum
A	Vehicle Projection	18'	22'
B	Stall Width	9'	11'

Parking Specifications

- Most efficient use of space at 200 sf per vehicle.
- Use this module in parking areas that have a slow turnover rate.
- Allowed on one-side of the road only.
- Typical compact car parking stall: 9' x 18'.
- Typical large car parking stall: 11' x 22'.
- Typical handicap parking stall: 13' x 18'.

45 degree On-street Parking

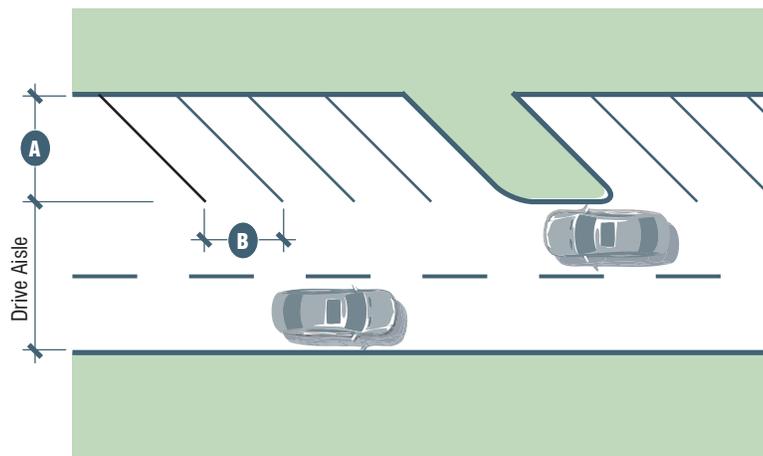


Figure ID	Overall Width	Minimum	Maximum
A	Vehicle Projection	18'	20'
B	Stall Width	12'	14'

Parking Specifications

- Parking configuration used when width of parking area is restricted.
- Allowed on one-side of the road only.
- Rear visibility is good; maneuvering is easy.
- Space requirement is 180 sf per vehicle.
- Use this module in parking areas that have a high turnover rate.
- Typical compact car parking stall: 12' x 17.66'.
- Typical large car parking stall: 14' x 20'.
- Typical handicap parking stall: 15' x 19'.

Sidewalks, Trails, and Bike Routes

Circulation Design Principles

General design guidelines should include the following:

- Provide a continuous access network for pedestrians and bicycles that provides a comprehensive means of connecting destination points.
- Ensure that routes provide convenient access and are comfortable and enjoyable for the user.
- Minimize conflicts between bicycles, pedestrians, and vehicles.
- Ensure crosswalks are adequately designed to slow traffic and provide safe crossing to pedestrians and bicyclists.
- Employ required markings, signage, and traffic calming measures to enhance safety throughout the network.
- Provide amenities such as plantings, seating, lighting, and trash receptacles. Especially at key gathering points.
- Provide universally accessible measures at intersections such as ramps wherever a sidewalk traverses a raised curb or other sudden grade change.
- Conform to ADA standards throughout the pedestrian network for access to all.
- Provide links to major attractions and generators of pedestrian traffic.
- Provide bicycle storage racks in areas that can be visually supervised and in proximity to building entrances, high activity areas, major work places, and recreational facilities. These racks shall be covered and easily accessible.

Circulation Network

The circulation network plan (Figure 4.9) depicts the

pedestrian and bicycle routes on the installation. In most cases, pedestrians and bicycles routes are integral with the street, thereby ensuring the optimal use of the same access corridors. See the Street Prototype Standards earlier in this chapter for design guidance. In cases where pedestrian and bike routes are separated from the street, refer to Table 4.7 for basic design criteria. The Circulation network plan comprises of the following:

- Trails: routes designated for both pedestrians and bicycles.
- Sidewalks: routes designated specifically for pedestrians.
- Bike Routes: Also referred to as dedicated bicycle lanes, these provide a circulation network specifically for bicyclists.
- Circulation Network Zones: areas where sidewalks and bike routes are integral to the street design to ensure the greatest diversity of access available for users. See the Street Prototype Standards earlier in this chapter.
- 10-Minute Walking Distance: the amount of time it takes to walk within major destination areas on the installation.

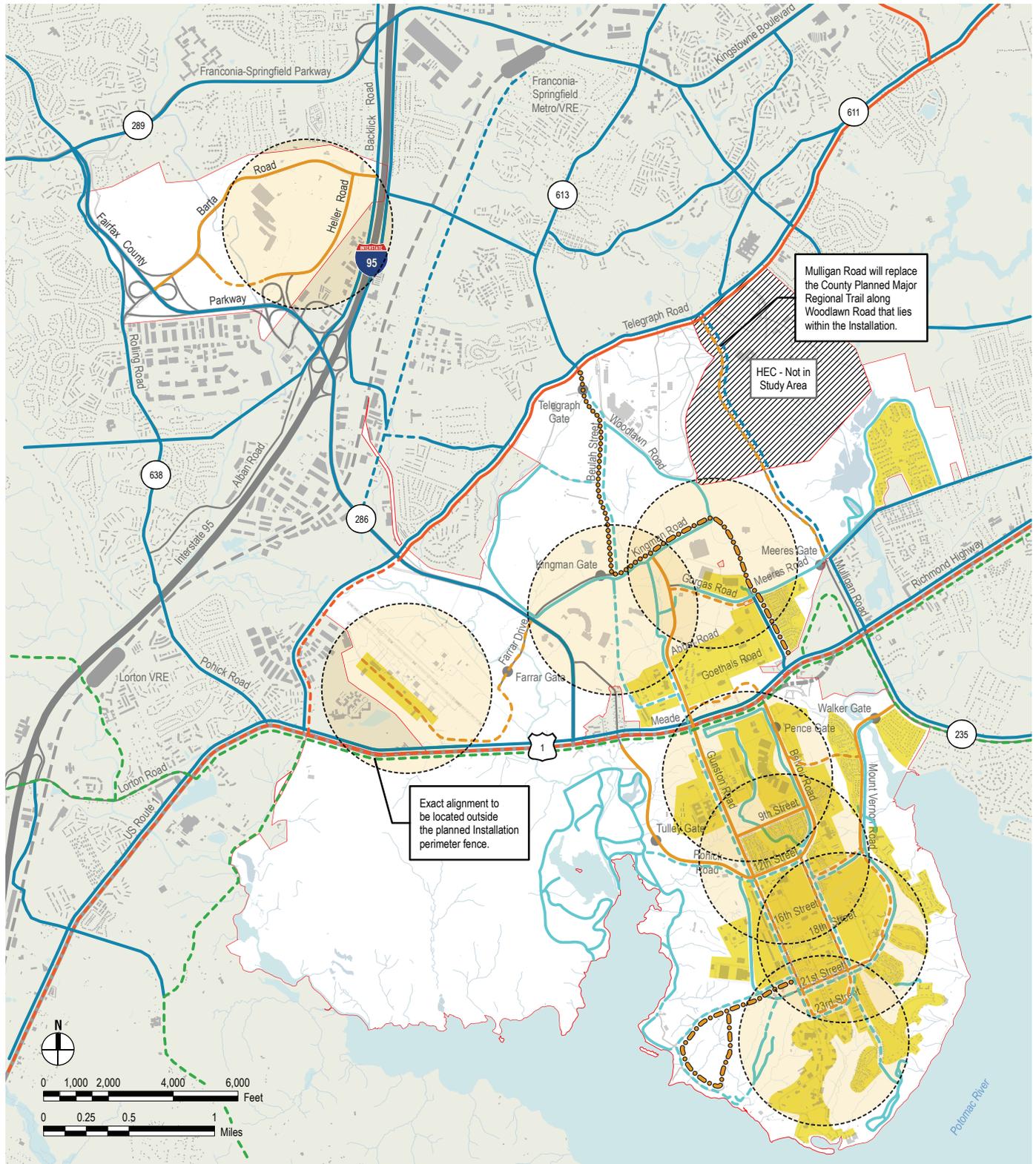


Pedestrian corridor within the Warrior Transition Complex provides access to the campus as well as FBCH.

Table 4.7: Sidewalk, Trail, and Bike Route Standards (when not associated with the Street Prototype Standards)

Description	Dimensions	Specifications	
		Purpose	Specifications
Paved		Purpose	Pedestrian/ Bicycle
		Width	4'-15'
		Material	Concrete, Asphalt, or Pavers on Aggregate Base
		Furnishing	Permitted
		Crossing	Painted or Decorative Pavement
Unpaved		Purpose	Pedestrian
		Width	4'-8'
		Material	Wood Chips or Ground Stone
		Furnishing	Permitted
		Crossing	Painted

Figure 4.9: Sidewalks, Trails, and Bike Routes Plan



- | | | |
|---|---|--|
| — Existing Fort Belvoir Trail | - - - Future Fairfax County Paved Trail | ●●●● Existing Fort Belvoir Shared Bicycle Lane (Sharrow) |
| — Existing Fairfax County Paved Trail | - - - Future Fort Belvoir On-street Bicycle Lane | ●●●● Future Fort Belvoir Shared Bicycle Lane (Sharrow) |
| — Existing Fort Belvoir On-street Bicycle Lane | - - - Future Fairfax County On-road Bicycle Route | ■ Circulation Network Zone |
| — Existing Fairfax County On-road Bicycle Route | - - - Future Potomac Heritage National Scenic Trail & Washington-Rochambeau Revolutionary Route | □ 10-min. walking distance |
| - - - Future Fort Belvoir Trail | | |

Access Control Points

Installation access control points (ACPs) are key components in the force protection security program. The most effective entrance design considers:

- **Security:** Maintain the perimeter security of the Installation by mitigating threats at the first line of defense.
- **Safety:** Provide a working environment that is safe and comfortable for security forces personnel, and that persons/vehicles enter and leave in a safe and orderly manner.
- **Capacity:** Maximize traffic flow without compromising safety and security or causing undue delays that can adversely affect Installation operations or off-post roadways.
- **Image:** Impart an immediate impression of the professionalism and image of Fort Belvoir, along with the commitment to protect DoD personnel and secure the Post's facilities and resources.

Design Parameter

ACPs 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. Their design must also reflect a design aesthetic appropriate for the Post. The notional layouts depicted in Figure 4.10 depict the variety of facilities to be expected, but not the intended final design. Rather, the ultimate design of the ACP will be configured in a way that best fits the site and fulfills its mission requirements.

Primary ACP

- Accommodates vehicles of commercial use, visitors, and DoD/Authorized personnel
- Located at perimeter of Installation to provide access to Post
- Processes the largest quantity and variety of vehicles

Secondary ACP

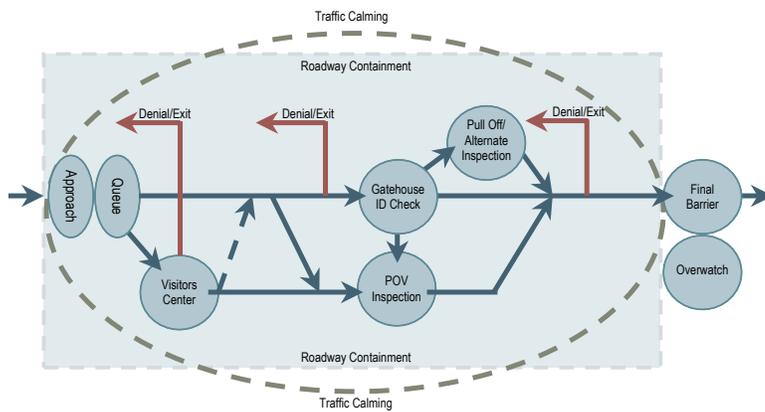
- Accommodates vehicles only for DoD and Authorized personnel.
- Located at perimeter of Installation to provide access to Post.
- Processes moderate quantities of POVs

Tenant ACP

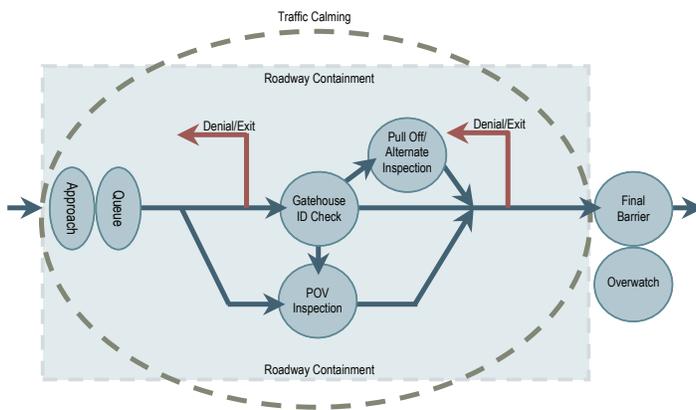
- Controlled and operated by individual tenant organizations.
- Accommodates vehicles for commercial use, visitors, and DoD/Authorized personnel at the discretion of the tenant.
- Located at perimeter of tenant organization's campus.
- Processes the least amount of traffic, and typically only DoD authorized personnel.

Canopies for ACPs

ACPs will have a canopy, which will cover the full width of incoming lanes at the Guard Booth. This canopy shall have a minimum clearance of 14.5 feet and 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.



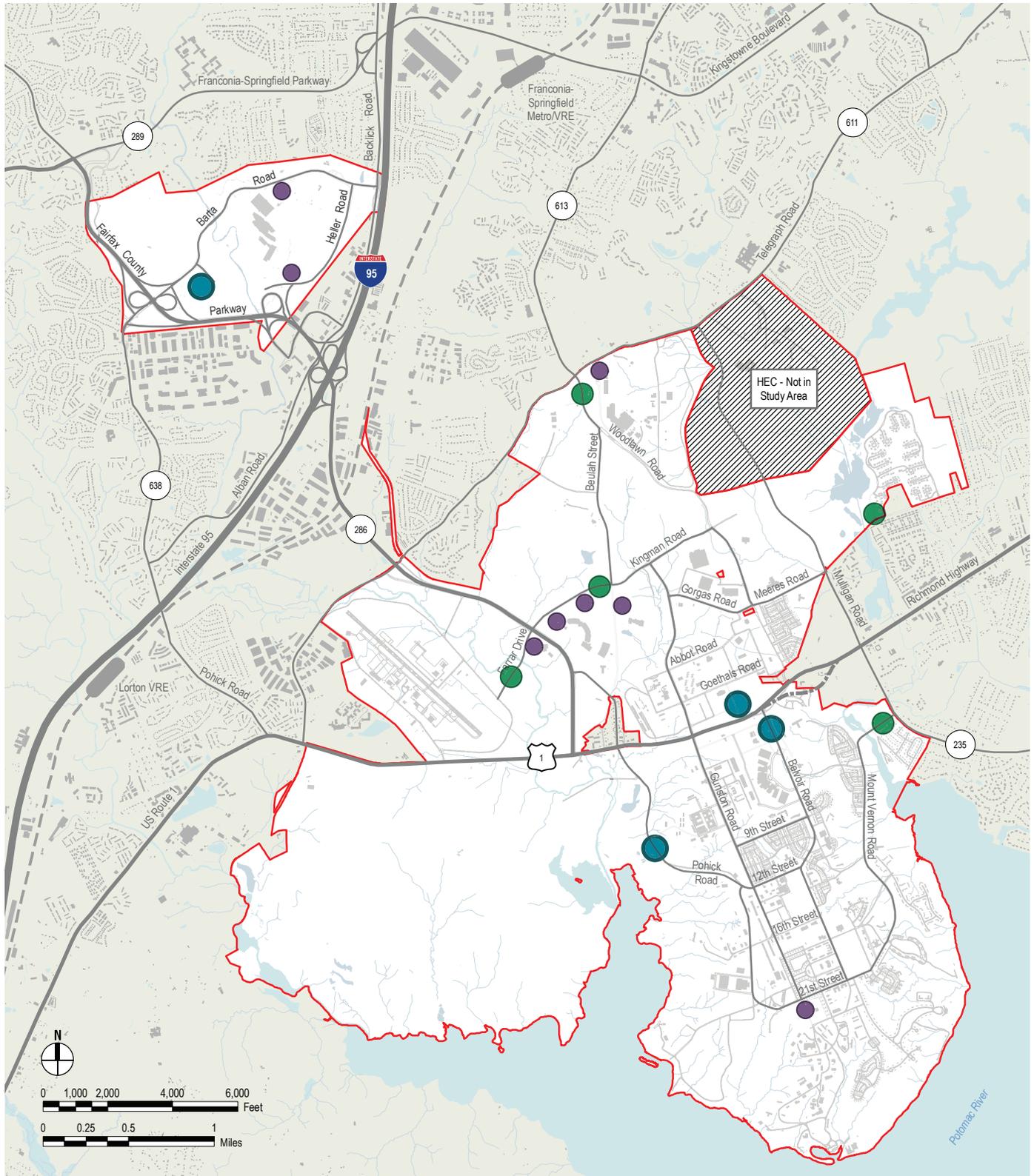
Primary ACP: Visitor/DoD Authorized Personnel



Secondary ACP: DoD Authorized Personnel Only

Figure 4.10: Entry Control Facilities Organization Diagram

Figure 4.11: Entrance Gates/Access Control Points



- Primary ECF - Visitor/DoD Authorized Personnel
- Secondary ECF - DoD Authorized Personnel Only
- Tertiary ECF - Tenant controlled and operated



Covered bicycle rack at the Warrior Transition Complex.



Open-grid pavers provide stormwater drainage and fire truck access to the Warrior Transition Complex.



Porous pavers used in the Fort Belvoir Community Hospital parking lot.

Sustainable Design Standards

The following sustainable design standards provide guidance on low impact development techniques and best management practices that can enhance the site as well as benefit the environment and the users. These include:

- Utilize low-impact design (LID) strategies for roads and parking areas that can absorb runoff.
- Providing bicycle racks, covered storage, and shower facilities in employment centers to give employees the option of biking to work. This reduces the need for parking, decreases air pollution, and improves employee health.
- Providing designated spaces for carpool/vanpool to promote vehicle sharing and reduce the need for additional parking.
- Designing and constructing the smallest parking area for the building occupants' needs. The Army requires that mission partners provide parking for 60 percent of their total employee population including handicap and vanpool parking spaces. This reduction in parking lot size minimizes environmental impacts on the site as well as promotes the use of mass transit, carpooling/vanpooling, and bicycling as a means to commute to work. Benefits include lower maintenance costs, reduction in air pollution, decreased heat island effect, and decreased stormwater runoff.
- Using pervious paving or open grid paving as an alternative to concrete or asphalt for parking lots and walkways. These paving systems allow water to seep naturally into the soil, thereby filtering and recharging the groundwater.
- Using hardscape materials that have a high reflectance to reduce the heat island effect.
- Incorporating solar panels on top levels of parking structures where possible to capture energy for site usage and provide shade for vehicles.
- Encouraging shared parking fully utilizes, high-demand, town center parking. Employees park during daytime working hours, and patrons park during night time activities.
- Pedestrian access ensures healthy communities and environments because it lessens the reliance on vehicles and fossil fuels. Communities that are easily walkable help to improve residents' and employees' quality of life, stimulate local economies, and reduce environmental pollution. Given the opportunity and facilities to walk in a safe, comfortable, and attractive setting, most people will choose to do so. It provides an alternative mode of traversing the Installation and reduces our dependence on the automobile.

Landscape Design Standards

5

Introduction

Purpose

The Landscape Design Standards includes the selection, placement, and maintenance of plant material on the Installation. 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. Landscaping adds an element of human scale to open spaces and can function to fulfill many needs including:

- Adds foundation and foregrounds for buildings and focal features
- Defines space and scale
- Reinforces the circulation system hierarchy
- Provides visual transition between dissimilar land uses
- Buffers from environmental and man-made conditions
- Provides shade, shelter, and wind protection
- Directs views and movement
- Reduces building energy costs

Guidance is given here for the most common landscape circumstances that may be encountered on the Post. However, each situation will require individual design guidelines to ensure the landscape solution best suits the site conditions. The intent of this section is to offer general guidance that will help establish a palette of choices from which to select. This ensures a modicum of consistency that will thread the many separate planting areas into a cohesive whole.



Woodlawn Village Community Center landscaping defines pedestrian spaces, gives a human scale to the facility, and enhances the architecture of the building.

Objectives

Landscaping is an important element in the design of outdoor spaces. Overall, the goals for plant material use include: improving the physical and psychological well-being of those living and working on the installation, contributing to the preservation and restoration of natural resources on Post such as wildlife habitats, and increasing sustainability of developments. These landscape goals are achieved through the following objectives:

- Preserves and enhances urban trees, forest lands, and detailed planting features, such as shrubs and groundcovers.
- Improves the overall visual quality of the Installation.
- Uses low-maintenance native plant materials, and eliminates invasive species.
- Blends the built environment with the natural environment.
- Provides scale and comfort within pedestrian environments.
- Reinforces the hierarchy of the circulation system.
- Screens unsightly views or elements, and buffers incompatible land uses.
- Enhances AT/FP capabilities.
- Requires the replacement in kind, or an agreed-upon alternative indigenous species, for trees and/or tree canopies that are to be removed or destroyed.
- Replacement of removed or destroyed vegetation shall consider the ecological setting, and habitat community to restore the natural biodiversity of the site.



Landscaping at the NGA Campus East directs pedestrians toward the main entrance and enhances the overall modern architecture of the site.



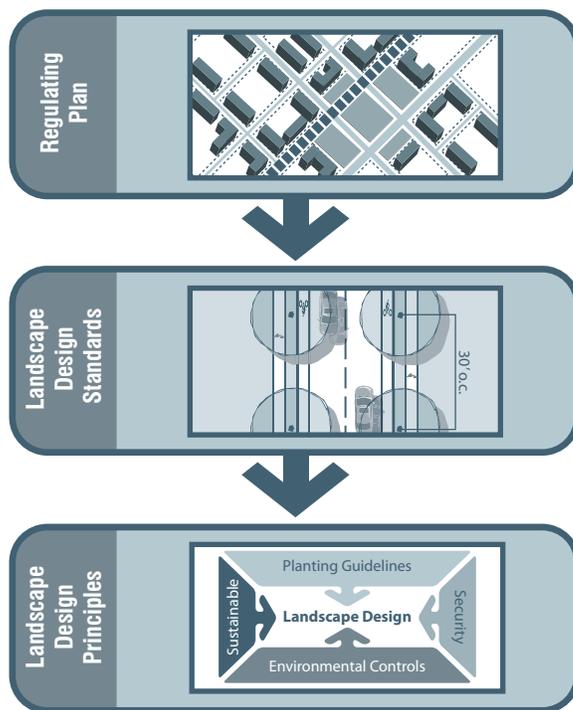


Figure 5.1: Landscape Design Standards Process

How to Use the Standards

This chapter offers design guidance for the treatment of Fort Belvoir's landscaping and open spaces. It is divided into separate landscape treatment topics that, when combined as a whole, interconnect, enhance, and unify the Installation's visual appearance. The sections are as follows:

- **Foundation Planting:** provides guidance on the landscape treatment of non-residential, residential and historic structures.
- **Screen and Buffer Planting:** includes recommendations for wind protection and visual screening.
- **Landmark Planting:** provides guidance on the treatment of focal points within the landscape.
- **Parking Lot Planting:** includes the landscape treatment of parking lots to enhance the visual appearance and improve circulation.
- **Streetscape Planting:** reinforces vehicular circulation hierarchy, provide orientation, and directs traffic.
- **Entrance Planting:** provides landscape treatment at facility and installation entrances.
- **Open Space Planting:** includes recommendations for the treatment of man-made open spaces and focal points.
- **Woodland Edge Planting:** provides guidance for sites after clear-cutting for building and roads has occurred.
- **Landscape Design Principles:** this provides general requirements that apply to all or most landscape installations. Think of it as a primer in basic design. Here are presented strategies and requirements that need to be considered for any type of landscaping design or installation to ensure a higher quality environment for Fort Belvoir military, employees, and residents.

Guidance in this chapter is provided in three steps (Figure 5.1) which lead into the following chapters of the IPS:

- Refer to the Regulating Plan in Chapter 2 for site location and requirements, or Chapter 4 for the type of street, intersection, trail, or parking area in question.
- Refer to the Landscape Design Standards listed above for all applicable site and roadway landscape treatments. These standards may include landscape treatments for buildings, streets, parking, mechanical equipment, focal points, common spaces, and site edges.
- Refer to Landscape Design Principles, which are strategies and requirements that need to be considered for any new construction or roadway improvements.
- Refer to the Site Elements Design Standards (see Chapter 6) for the recommended site furnishings associated with each district including site, streetscape, trail, and public spaces.

Appendix B includes a section on plant material selection and the applicable plants appropriate for installation on Fort Belvoir.

Landscape Design Standards

The following landscape design standards illustrate the intent of Fort Belvoir's landscape principles and reflect the spirit of design appropriate for the Post. However, landscape design is very site specific. Planting plans must consider site conditions (soil, topography, adjacent uses, and architecture) and climatic criteria (sun, shade, and moisture requirements), as well as the desired plant characteristics (for example, form, texture, color, and size). For further guidance on plant selection refer to the Plant Selection List (Table B.3) in Appendix B. The uses and users of the site must also be considered; therefore, proposed landscape plans need to be developed in coordination with Fort Belvoir's DPW staff.

Foundation Planting

Foundation planting adds decorative seasonal interest to a structure. It also helps to soften architectural lines and gives the building a vegetated podium on which to rest. AT/FP guidelines are important considerations, and the most recent AT/FP guidelines must be referenced when designing or implementing foundation planting plans. Discussed here are the primary types of facilities on Fort Belvoir that may require foundation planting.

Foundation planting provides a green background for additional planting, 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. When developing foundation planting plans, consideration shall be given to anti-terrorism measures. Design guidelines include:

- Locate focal and seasonal plantings at building entries for pedestrian interest.
- Use the architecture of the building to evaluate the planting design and selection of plants.
- Do not block windows or views from interior spaces with plant material.
- Place trees setback from the building walls to provide space for mature growth and to prevent root systems from damaging the foundation.
- Use a symmetrical foundation planting design for symmetrical buildings.
- Do not plant flowering plants near entrances because of the possibility of insect problems (bee stings, etc.).



Understated plantings give a restrained, yet elegant appearance that softens architecture and provides foreground.



Foundation plantings offer seasonal interest at a pedestrian level for residents.



Foundation planting shall relate to the architectural character of the building and be in proportion with the building.



Foundation planting of historic symmetrical buildings shall have a symmetrical landscape design.

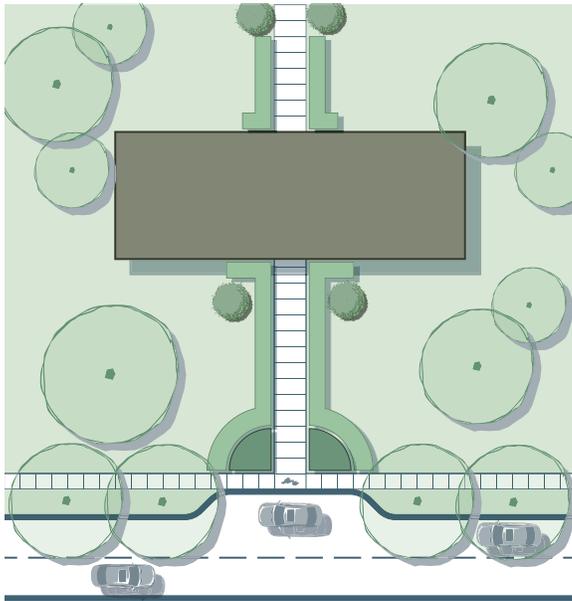


Figure 5.2: Non-residential Foundation Planting

Non-Residential Buildings Foundation Planting (Figure 5.2)

- Consider foundation plantings in relation to the architectural character, and proportion of the building.
- Remove or remediate existing vegetation that is overgrown or out of context into a new planting scheme and prune.
- Plant single species of evergreen or deciduous shrubs to create a uniform hedge. Prune shrubs to form a dense hedge, rather than shaping each plant.
- Use plantings to highlight entrances of buildings.
- Use ornamental deciduous or evergreen trees as accents or to terminate hedge planting.

Residential Buildings Foundation Planting

Because RCI manages all the residential villages on Fort Belvoir under a 50-year lease, general landscape guidelines are provided to enhance the Traditional Neighborhood Design and aesthetics of the homes.

- Plantings shall relate to the small, intimate scale of individual/clustered living residences.
- Planting designs shall allow for ornamental variety, or provide an area for residents to garden.
- Foundation plantings shall frame the entrances and give adequate foreground to the houses.
- Foundation plantings shall have a unified appearance among all houses to avoid visual clutter. Variations is permitted by plant selection and placement.
- Consider having community gardens for residents' use.
- Consider implementing a mix of ornamental deciduous and evergreen trees.
- Provide a minimum of one shade tree on each property.



Landscaping can create small, intimate gardens for residents to socialize and enjoy (Fairfax Village).

Historic Buildings

- Consider carefully the type and design of plantings adjacent to historic structures.
- Gather historic photographs to determine original intent of plantings and their function within the cultural landscape.
- If research reveals that foundation plantings were not used, or current plantings are not in keeping with historic character, then the absence of plant material or corrective measures are viable options.
- Keep plantings that are pruned and heavily manicured to a minimum to avoid excessive maintenance and cost.
- Preserve and maintain plantings that contribute to the historical landscape.
- Coordinate landscape modifications conducted adjacent to historic structures with the Installation Cultural Resource Manager.
- Refer to Appendix B for additional historic preservation guidance regarding landscaping for historic buildings.



Foundation plantings can enhance the aesthetics of historic buildings if properly designed and implemented (Abbot Hall).

Screen and Buffer Planting

Plantings used for screens and buffers can help eliminate conflicts between incompatible land uses, primarily associated with poor views, safety, security, pollution, and noise. In many instances, preservation of existing vegetation or woodlands is adequate. Where new plantings are needed, the use of evergreens is usually recommended. Incorporating deciduous material is beneficial for more naturalized plantings and greater visual interest.

- Windscreens.** Use a combination of evergreen and deciduous trees to provide windbreak protection from prevailing winds (Figure 5.3). Windbreak plantings shall 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. Fences or walls may be incorporated to increase buffer effect.
- Visual Screen.** Use a combination of evergreen and deciduous trees either alone or to supplement a structural screen (fence or wall) to mitigate the views of utilitarian elements, such as dumpsters or service areas (Figure 5.4).
- Buffer Planting.** Use a mixture of evergreen and deciduous trees and shrubs to visually separate land uses and to help separate visual zones. Buffer plantings can also be used to prevent visual surveillance and reduce noise and air-borne pollutants.

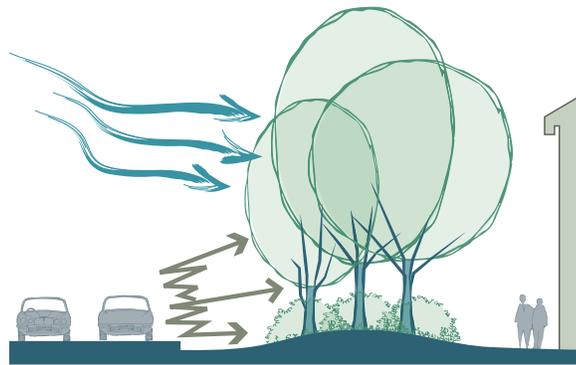


Figure 5.3: Screen and Buffer Diagram

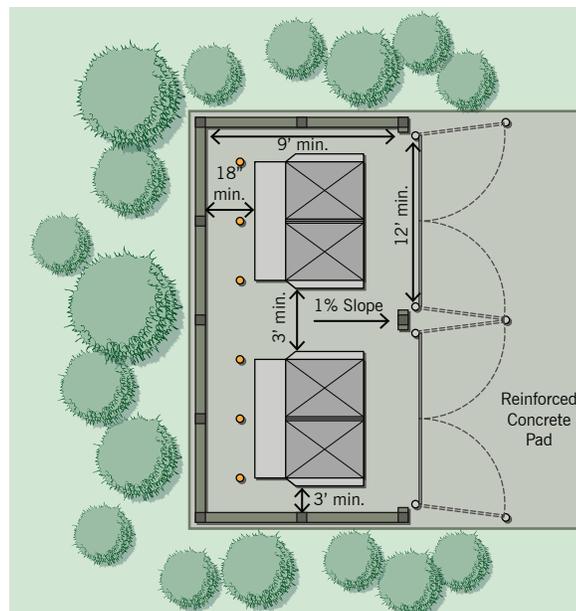
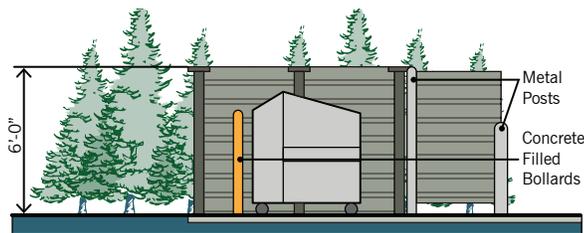


Figure 5.4: Dumpster Screen Diagram



Planting next to screening walls add to the effectiveness of screening dumpsters.



Planted visual buffers can screen parking lots from adjacent land uses. (northwest DLA parking area along John J. Kingman Road, Fort Belvoir).

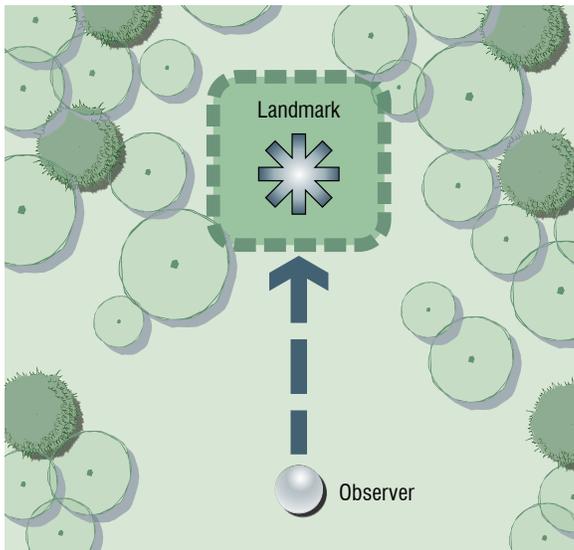


Figure 5.5: Landmark Planting Diagram

Landmark Planting

Focal points and landmarks are elements within the landscape, either man-made or natural, that give one a sense of place and provide orientation. Focal points may also have significant historical, social or philosophical significance.

Landscape plantings at focal points or landmarks are particularly susceptible to scrutiny. Their association with promoting important features calls much attention to the plant material and its condition. Landscaping under these circumstances shall:

- Not distract, overwhelm, or obscure the focal point itself (Figures 5.5 and 5.6).
- Enhance interest and direct attention to the focal point.
- Consider mature size, shape, and overall visual effect of plant material throughout the year.
- Analyze a focal point's cultural importance and context of its surroundings, and then design accordingly.

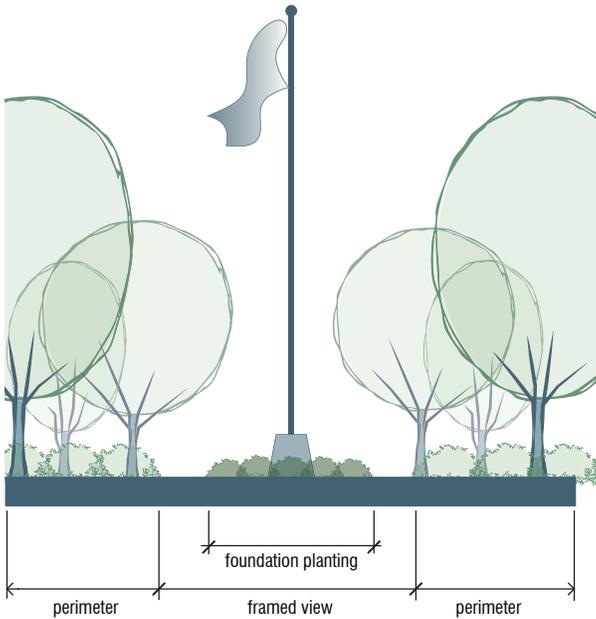


Figure 5.6: Section of landmark placement and framed view.



Decorative plantings emphasize important buildings and landmarks.

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 (Figures 5.7, 5.8 and 5.9). Design guidelines include:

- Use shade tree planting at parking lots to reduce glare and moderate ambient air temperatures on the lot. Trees shall provide 40 percent shade coverage within 10 years of installation.
- Choose trees and shrubs that require minimum maintenance, and irrigation.
- Consider sight distances near entrances and exits when selecting and placing plant material.
- Select trees, shrubs, and ground covers that can withstand harsher conditions, such as sun, glare, heat, pollutants, and salt.
- Use a mix of evergreen and deciduous plant material to screen parking areas from adjacent uses.
- Connect planting islands and medians with trenches of improved soil beneath paved surfaces.
- Remove tree limbs up to a minimum eight feet in height to maintain visibility within parking lot.
- Design parking lots to preserve significant existing trees.
- Provide enough planting area around proposed trees that allow enough room for root flare at base of trunk and prevent damage from car bumpers.

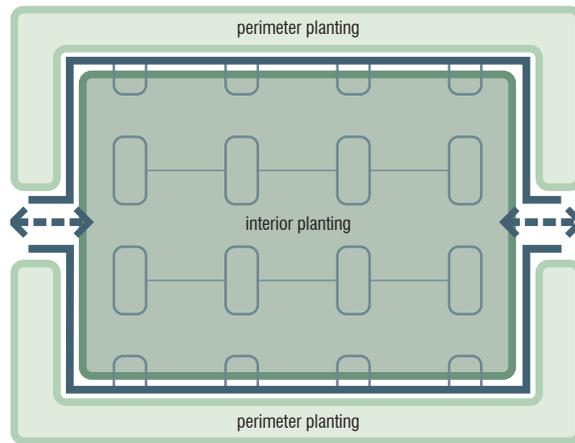


Figure 5.7: Parking lot planting diagram

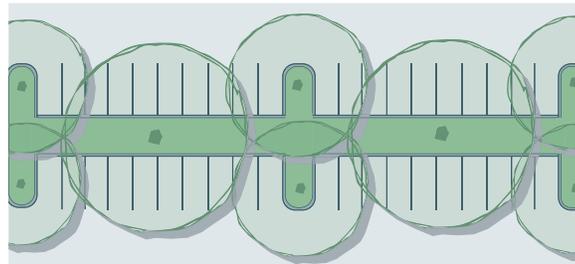
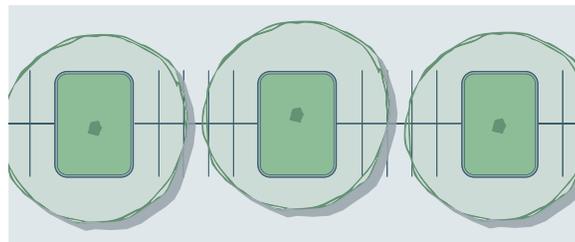


Figure 5.8: Parking Lot Interior Planting

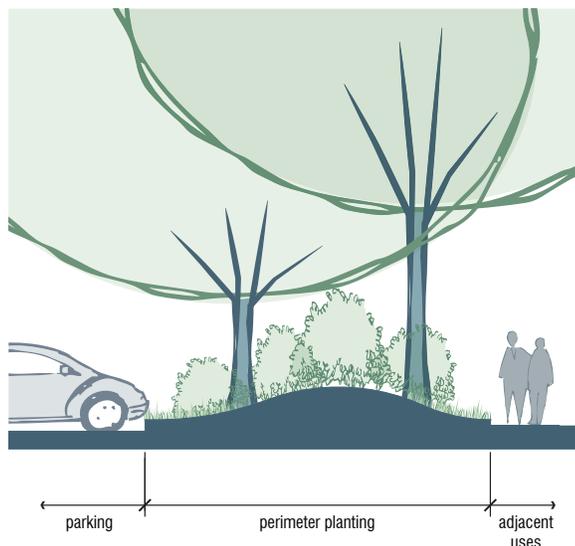


Figure 5.9: Parking Lot Perimeter Planting

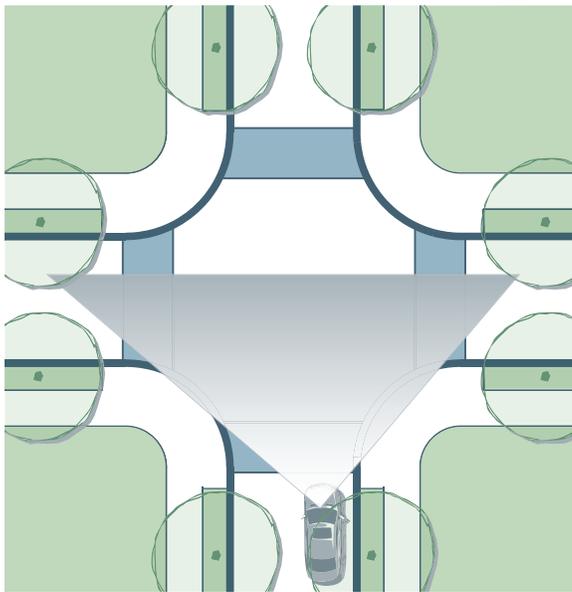


Figure 5.10: Site triangle diagram

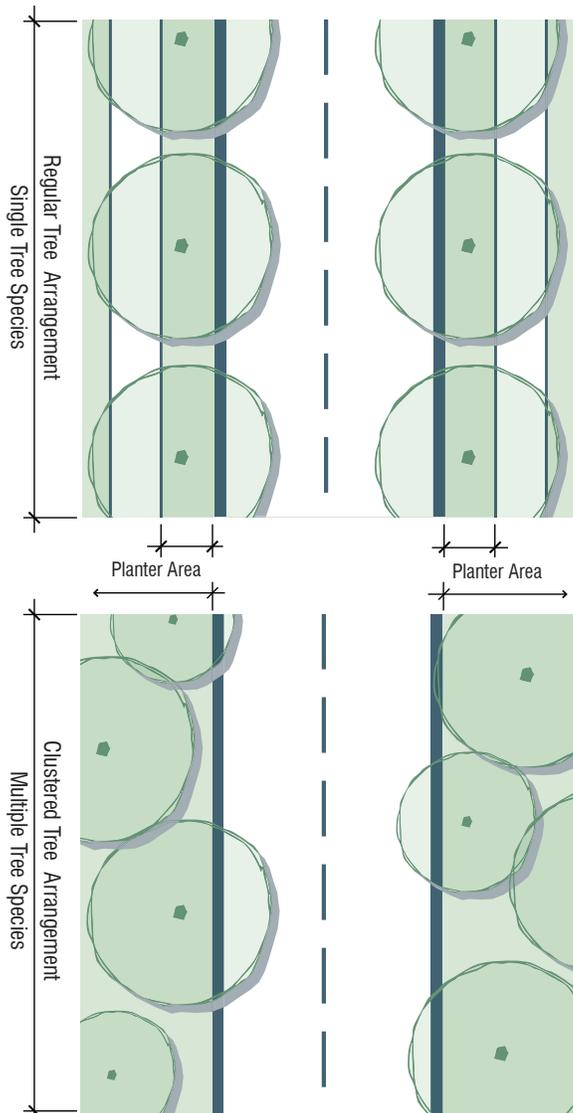


Figure 5.11: Street Tree Management Diagram

Streetscape Planting

Street tree plantings shall be used to reinforce vehicular hierarchy, orient and direct traffic, upgrade views, and to visually de-emphasize on-street parking. 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, historic district, community area, or other similar entity). Below are general guidelines for street plantings.

- As a general rule, street trees shall be deciduous species, resistant to salt and root pressure. At maturity there shall be a 12 feet to 14 feet high clearance between the street pavement and branch height to allow adequate clearance for pedestrian and vehicle traffic to pass unimpeded under lowest branches (Figure 5.10).
- Streetscapes with regular planting arrangements will have uniformly spaced trees of a single species that relate directly to road alignments (Figure 5.11). Plantings will conform to the circulation hierarchy, transportation modes, and local context.
- Streetscapes with clustered planting arrangements will have irregularly spaced trees in asymmetrical planting patterns that relate directly to woodland edges or other natural features. Plantings will include multiple native plant species.
- Within sight triangles, use appropriate plant heights to ensure unobstructed views at intersections.
- Weeping trees shall not be used in locations where they may hang over the roadway or block views.
- The street tree layout shall be coordinated with the proposed street lighting layout.
- Set trees three to six feet (one to two meters) from the back of curbs.

A well-designed street tree planting will consider and be directly related to the character of the road they align. Figure 5.12 depicts the road hierarchy on Fort Belvoir, which dictates specific street tree planting strategies (Table 5.1).

- **Parkway:** These serve as primary entrances and circulator roads that traverse a range of settings. These include: Pohick Road, Theote Road, Mt. Vernon Road, John J. Kingman Road, and Woodlawn Road. Where roads pass through existing woodlands, supplemental street plantings shall enhance the natural character of the forest. The landscape design shall consider important views and vistas. In developed areas, the planting is permitted to become formal, with regularly spaced trees that respond to urban conditions.
- **Boulevard:** This is the primary circulator loop for the Installation, and includes Gunston Road, Belvoir Road, John J. Kingman Road, and 23rd Street. Planting design is to be formally arranged, with regularly spaced trees. The uniform appearance shall highlight the road hierarchy and work to strengthen the visual connection between North and South Posts.
- **Avenues:** Planting arrangements are to be formal, and disposed in a fashion that relates to the context of surrounding architecture and public use of the street. These include Gorgas Road, Abbot Road, Goethals Road, Third Street, Ninth Street, 12th Street, 16th Street, and 21st Street.
- **Street:** These are two-lane roads that include Beulah Road, Warren Road, Surveyor Road. Woodlawn Road, and Gillespie Road. Planting schemes shall be consistent with the existing surroundings, which can vary from naturalistic woodlands to urban development. Roads located in natural areas of the Post, usually off the plateau, shall be landscaped informally, in a manner that supplements existing vegetation. Those in developed areas shall have a formal planting arrangement of regularly-spaced trees.
- **Tertiary:** These streets service individual facilities or residential areas, and typically are no more than two lanes wide. Landscape planting can have an informal or formal design, depending on the context of the location. Tertiary streetscapes pertain to all residential villages, except Gerber Village, and to interior streets within the urban core.



Pohick Road (Primary Road I: Parkway)



Belvoir Road (Primary Road II: Boulevard)



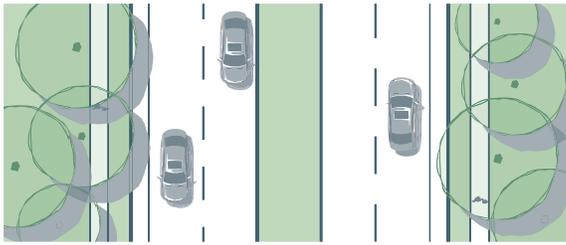
Doerr Road (Secondary Road I: Avenue)



Surveyor Road (Secondary Road II: Street)

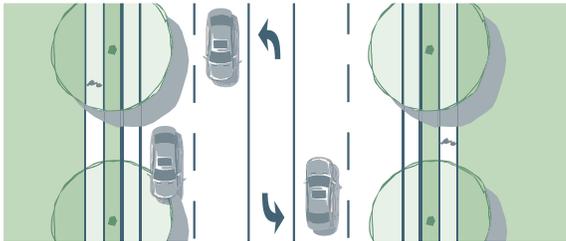
Table 5.1: Streetscape Planting Types and Specifications

Primary Road I: Parkway



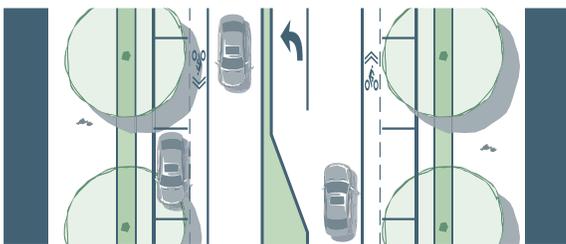
Arrangement	Clustered
Spacing	Random
Species	Multiple
Planter Type	Natural Landscape
Planter Width	Not applicable

Primary Road II: Boulevard



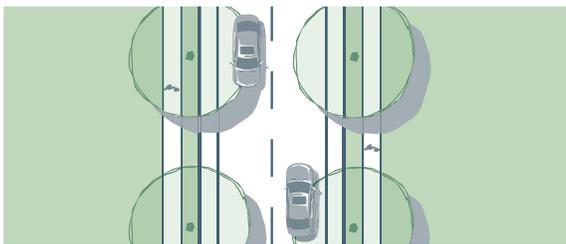
Arrangement	Regular or Clustered
Spacing	30'-35' or Random
Species	Single
Planter Type	Continuous Planter
Planter Width	8'-10'

Secondary Road I: Avenue



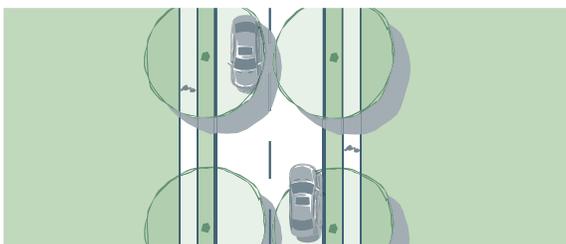
Arrangement	Regular
Spacing	25'-30'
Species	Single
Planter Type	Continuous Planter
Planter Width	15'-25'

Secondary Road II: Street



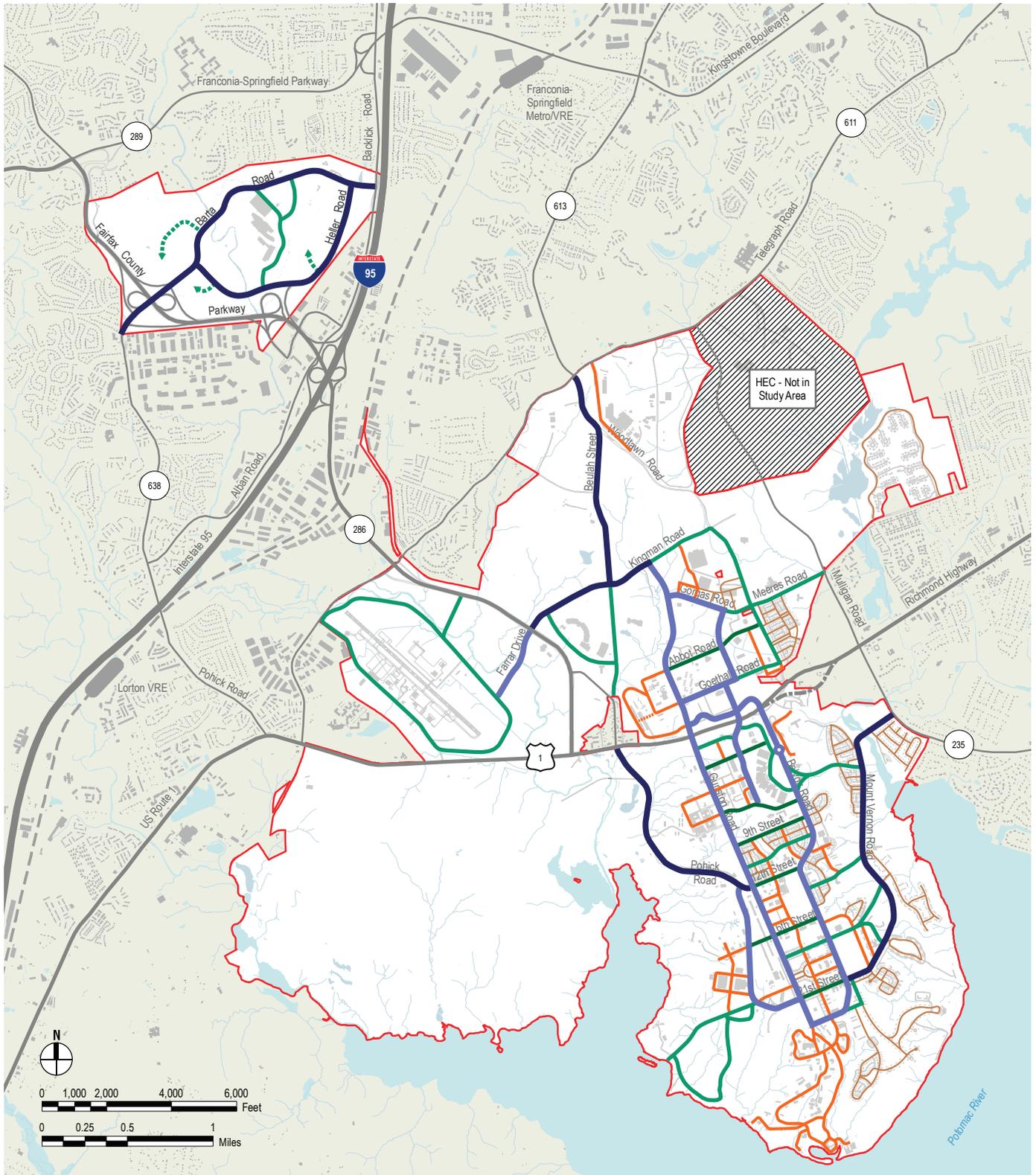
Arrangement	Regular
Spacing	25'-30'
Species	Single
Planter Type	Continuous Planter
Planter Width	4'-8'

Tertiary Road



Arrangement	Regular or clustered
Spacing	20'-30' or Random
Species	Multiple or Single
Planter Type	Natural Landscape or Continuous Planter
Planter Width	4'-6'

Figure 5.12: Road Hierarchy Regulating Plan



- | | | | | | |
|---|----------------------------|---|---------------------------|---|--|
|  | Primary Road I: Parkway |  | Secondary Road I: Avenue |  | Tertiary Road |
|  | Primary Road II: Boulevard |  | Secondary Road II: Street |  | Residential Roads
(guidance not given in this document) |



Residential entrance planting at the Lewis Village Neighborhood Center



INSCOM entrance planting



Entrance landscaping at Tulley Gate

Entrance Planting

Installation entrances and streetscapes, as well as entries into distinct sub-zones, shall have landscaping that provides a strong visual image throughout all four seasons. Attractive plant material gives a positive visual impression for visitors and personnel. Landscape for entrances shall:

- Maintain a consistent appearance to unify the Post's identity and provide one with a sense of place.
- Not obscure signage or entry features.
- Not obscure lines of sight.
- Create interest and further concentrate a viewer's attention on the gateway.
- Provide a backdrop for signage, and contain mostly ornamental trees and shrubs to create visual impact.
- Integrate with the Force Protection. Low shrubs, groundcover, annual/perennial plants, and canopy trees can provide seasonal interest, while maintaining the views required to ensure force protection. 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.

Open Space Planting

This planting is typically associated with man-made elements of the landscape. These are areas or spaces formed by the arrangement of artificial features that create or define a particular use (Figure 5.13). The importance of providing varied forms of open space is critical to providing a diverse environment on the Post. Likewise, landscape treatments must complement how a particular open space area is used. Landscape for open spaces shall:

- Enhance open space areas with plantings. Use a mix of evergreen, deciduous, and flowering trees. Plant the same kind of trees in massive groupings to impact the vast open areas.
- Match the size and importance of the space. For instance, in very large open spaces, large shade trees and evergreen trees can be used. Smaller trees will not make a noticeable impact.
- Analyze areas for desirable and undesirable views. This study will assist the designer in placing landscape improvements, deciding where to channel and focus views.
- Respect the individual character of the space and how it is used.
- Maintain and/or improve landmarks and focal spaces to preserve any historic, social, or philosophical significance. Spaces include the Long Parade Field, Fremont Parade Field, golf courses, and greenswards in Belvoir Village.
- Recreation sites shall have landscaping that screens views, controls the microclimate (shade, wind, sun block, etc.), defines use areas and circulation, and highlights focal points. Examples of recreational open space include Fremont Parade Field, golf courses, exercise and walking trails, baseball/sports fields, and play areas.
- Identify historic open spaces and maintain their general character and use.

Woodland Edges

Soften the edges of woodlands, especially after clear-cutting for building sites and roads. Use a mix of evergreen, deciduous, and flowering trees that are native and appropriate for the local habitat (Figure 5.14). Additionally, this type of planting design can be used to introduce greater color and texture for year-round interest. Plantings should transition in height from low maintained lawn areas to taller plants found in forest areas (see Figure 5.14).

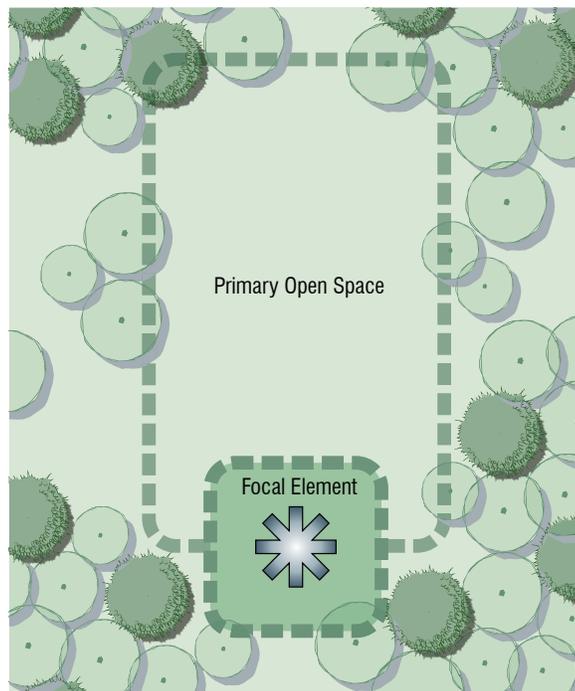


Figure 5.13: Open Space Landscape Diagram



Trees and shrubs frame the flagpole as a focal point on Long Parade Field.

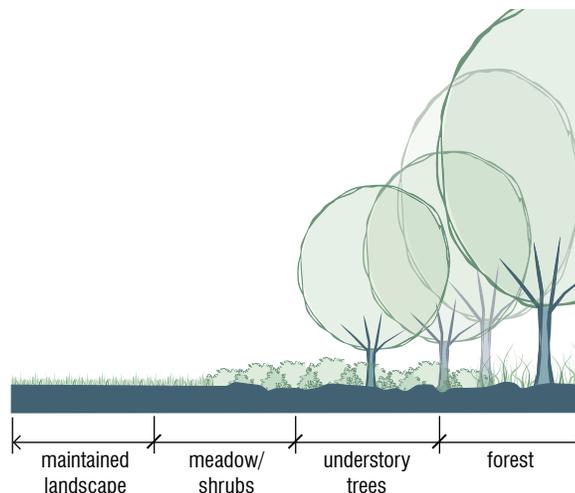


Figure 5.14: Woodland Edge Transition Planting

Landscape Design Principles

Landscape design is based on the following principles:

- **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.
- **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.
- **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.
- **Rhythm.** Repetition of a single plant or a mass of plants provides visual interest and formality to the landscape (Figure 5.15). Rhythm produces emphasis and unity, and is especially effective in articulating main circulation routes.
- **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.
- **Simplicity.** Landscape plans shall be broad and simple in form to limit excessive maintenance. Plant material shall be grouped in beds with simple edges that are easy to mow. Small turf areas shall be avoided because of the difficulty of mowing. The use of annuals shall be minimal because of the high maintenance involved.
- **Ultimate Effect.** The landscape plan shall be prepared with consideration for the mature size of all plants. The spacing of all material shall utilize nursery industrial standards for mature material to account for spread as well as height. The ultimate height of the material shall also be considered in relation to windows and other visual concerns.
- **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.

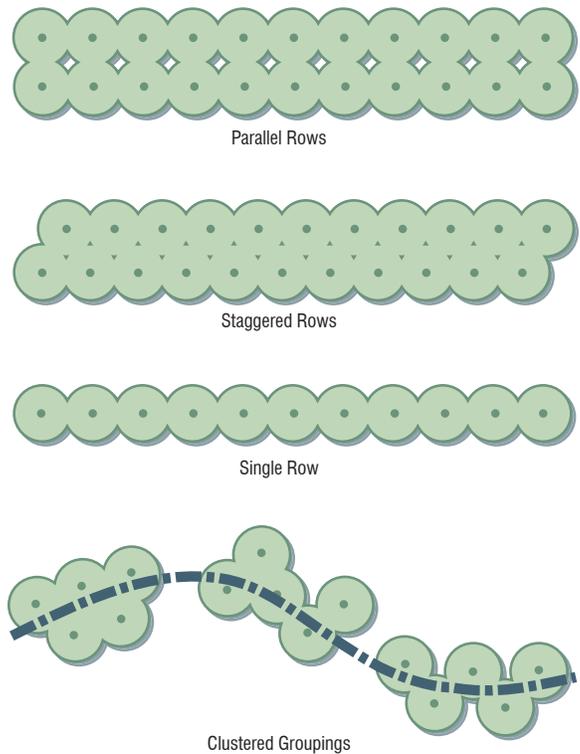


Figure 5.15: Planting Arrangements.

Environmental Control Planting

When properly placed, plants can provide environmental benefits, as well as address visual concerns.

- 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.
- Locate deciduous planting 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.
- Use mixed massings of deciduous shrubs in combination with evergreen trees and shrubs to provide sound control along primary and secondary roads.

Low Water Consumption Landscaping

When possible, utilize the following strategies:

- Use landscape designs and plants that are drought tolerant and minimize large expanses of turfgrass that need irrigation..
- Use collected stormwater or grey-water for irrigation or water features.
- Incorporating rain gardens and/or cisterns to capture and divert water toward planting areas.

Anti-Terrorism / Force Protection Considerations

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.

Proper selection and placement of trees and shrubs can be used to provide visual screening without creating concealment for covert activity. The landscape architect responsible for tree placement shall work closely with installation force protection experts to design a landscape plan that provides visual screening without compromising anti-terrorism measures (Figure 5.16).

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

- Establish clear zones 12 feet minimum from inhabited structures and security fencing to prevent concealment of objects or packages six inches in height.
- Provide vegetative groupings and landforms to reduce the blast effect and screen sensitive areas from off-installation views.
- Minimize potential hiding places for bombs and aggressors with plant material selection and placement. 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.
- Locate trees and planters to prevent penetration of an attack vehicle into secure areas.
- Use dense, thorn-bearing plant materials to create natural barriers.



Landscaping pictured here meets the minimum AT/FP force protection standards for stand-off distance from the OCAR facility.

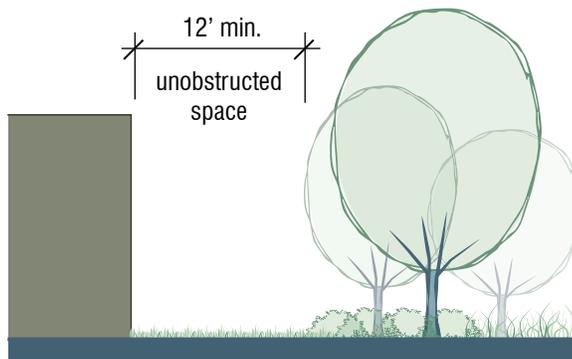


Figure 5:16: AT/FP planting stand-off distance from building



Protection barriers installed during construction can protect trees.



Tree protection barrier installed at the drip line of the tree can maintain the critical root zone.



Root barriers may be used to retain root growth, or direct it away from certain areas.

Tree Protection Standards

Existing urban trees and forest shall be preserved if they are in good health. Construction shall be planned to provide for the preservation of significant trees. Existing trees that cannot be preserved shall be considered for transplanting to a different location on site or to a different site.

Guidelines include:

- All trees to be retained and protected on job sites are to be identified by the Contractor, by the Contracting Officer's Representative, and by the Fort Belvoir DPW ENRD prior to the start of any construction work.
- The Contractor, the Contracting Officer's Representative, and the Fort Belvoir DPW ENRD shall refer to any and all tree protection policies and standards that are in effect for the Installation and Army, or develop a preservation plan that is mutually agreeable.
- Tree trunks, as well as critical root zones, are to be protected during all phases of construction. The critical root zone extends at a minimum distance from the trunk to the outer drip line of trees with full and unobstructed crowns.
- Critical root zones are to be validated by an International Society of Arboriculture (ISA) Certified Arborist.
- A protective fence, or other approved and appropriate barrier, is to be placed at the outer line of the critical root zone. This line shall be maintained and respected by all construction activities.

Root Control Barriers

- Root control barriers are to be installed where new sidewalk installation will be in contact with existing tree roots, or where trees are scheduled to be planted and may have a detrimental impact on sidewalk integrity and safety.
- Root barriers are installed to direct root growth downward for greater anchoring support, and away from sidewalks, curbs, and other hardscapes.

Sustainable Design Standards

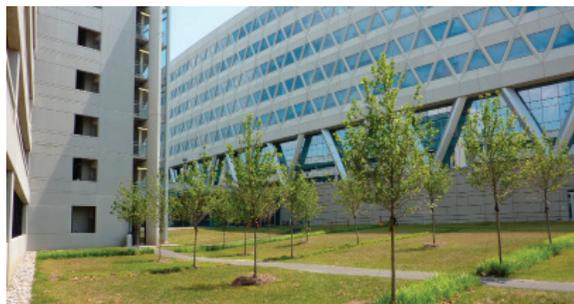
The following sustainable design standards provide guidance on low impact development techniques and best management practices that can enhance the site as well as benefit the environment and the users. These include:

- Restoring or maintaining natural areas on the project site to benefit both the environment and building occupants.
- Using native and adaptive plants in landscaping or restoration projects where appropriate for low maintenance and costs benefits.
- Using landscape designs that utilize drought tolerant species and minimize large expanses of turfgrass, or leave grass unmown to create meadows in infrequently used areas.
- If exterior water features are desired, implement stormwater or grey-water reuse systems utilizing cisterns to eliminate the need for continuous potable water supply.
- Installing one to three inches of mulch around plants to prevent water evaporation.
- Incorporating rain gardens and/or green roofs into the design of the project where appropriate to capture and/or treat stormwater on site.
- Incorporating bio-swales and other low-impact development systems to collect and filter stormwater runoff.
- Using shade tree planting at parking lots to reduce glare and moderate ambient air temperatures on the lot. Trees shall provide 50 percent shade coverage within 10 years of installation.
- Managing landscaping efficiently including the use of irrigation water and the amount of fertilizers and maintenance equipment needed.
- Following the integrated pest management plan to preserve the environment while supporting building operations.
- Installing drip irrigation where appropriate to water landscape plants. Drip irrigation is 90 percent efficient versus conventional irrigation which is 65 percent efficient in delivering water to the plants roots.
- Installing weather- or sensor-based irrigation control technology to use local weather and landscape conditions, tailoring the irrigation schedule to actual conditions on the site.
- Removal of invasive plant species and re-vegetate impacted area with native plant material per the INRMP.

- New facility construction must meet federal, state, and local requirements for stormwater runoff quality and quantity control, as well as industry standards for sustainable design. These include:
 - Energy Independence and Security Act (EISA) of 2007, Section 438
 - Virginia Erosion and Sediment Control (VESC) regulations
 - Virginia Stormwater Management Program (VSMP) Permit regulations
 - Environmental Protection Agency (EPA) Chesapeake Bay Total Maximum Daily Load (TMDL) for Nitrogen, Phosphorus and Sediment
 - Fairfax County Public Facilities Manual (PFM)
 - LEED® Stormwater Design criteria



The Fort Belvoir Community Hospital green roof will insulate the facility as well as treat stormwater runoff.



Native and adaptive plants were used for landscaping at NGA to minimize maintenance and associated costs.



Bioswales at Fort Belvoir Community Hospital provide stormwater filtration for the site.

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Site Element Design Standards

6

Introduction

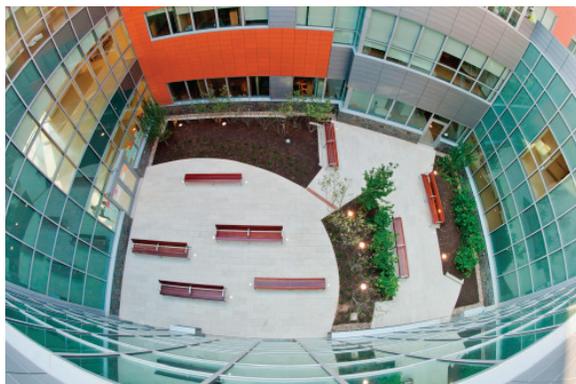
Site elements include utilitarian outdoor amenities, such as site furnishings, signage, lighting, and utilities. Through the use of style, scale, and color, a well-selected palette of site elements can support the unique character of each district, while creating a consistent image for the entire installation. They create an aesthetic character that blends with the community and reflects local and regional design standards.

This chapter provides overall objectives for site elements and detailed guidelines for utilities, lighting, signage, and site furnishings.

Site Element Objectives

Site elements will be selected when the plans for existing and future installation are prepared. Their selection is governed in part by the Regulating Plan in Chapter 2, to conform to the distinct palette of the location, and to enhance the appearance and sustainability of the Installation. Design guidance for site elements includes:

- Provide site elements that are appropriate for their intended function.
- Establish a coordinated system of site elements that provides consistency and continuity throughout the Installation to convey a sense of organization.
- Design and locate the various site elements to express the image, character, and scale appropriate to the district.
- Design and locate all site elements to meet AT/FP requirements.
- Use recycled/salvaged materials wherever possible.
- Minimize maintenance and repair by selecting: durable materials and finishes, quality products and workmanship, and elements that are vandal-resistant.
- Minimize negative visual impacts of all utility systems.
- Minimize environmental impacts of all utility systems.
- When involving ground disturbance, consultation with the Installation Cultural Resources Manager must be conducted for archaeological review and assessment.



FBCH Healing Garden



Residential Site Furnishings



Utilities

Utility systems provide the basic infrastructure for power, communications, water, and sewer services, which are necessary for the operation of the installation. They also play a key role in its visual quality. Primary negative impacts to visual quality result from the clutter of overhead utility lines and poorly designed storm drainage systems.

Utility systems shall be designed to minimize visual and environmental impacts, as well as 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, along with recommendations for their location and design, are included here.

Electrical Network

Dominion Virginia Power (DVP) supplies electricity to Fort Belvoir through the Utilities Privatization Contract. Under the contract, DVP leases the electrical distribution lines for 50 years since August 2007. The privatization agreement excluded the electrical distribution systems at FBNA, ADFE, HEC, and Building 2310.

Over the last four years with the implementation of BRAC projects on Post, DVP has completed a number of projects to provide additional capacity, reliability, and redundancy to the system. The distribution system is well balanced and has adequate capacity to serve existing needs. Future upgrades are not planned for at this time. The following section provides guidance on the treatment of the electrical system to minimize negative visual impacts.

Overhead Transmission Lines

Overhead utilities shall be relocated underground wherever possible to reduce negative visual impacts, maintenance, and repair. Underground utilities are also desirable for protection from terrorist or other enemy attack. If this is not possible, then minimize overhead negative visual impacts by using the following design techniques:

- **Overhead Transmission Lines Location.** Overhead transmission lines shall be aligned along edges of land use areas to avoid dividing an area and creating gaps or unusable areas. They shall conform to natural landforms, which can be utilized for screening lines from public view. Hills shall be crossed obliquely rather than at right angles. Alignments along hill crests or steep grades shall be avoided. Long straight runs of lines shall be avoided and broken up by offsets at logical intervals.
- **View Screening.** Minimize long views or silhouette views of overhead transmission lines from along roads and other public viewing areas. To avoid the “tunnel effect” of long, straight, uninterrupted views along the alignment, only clear the vegetation within the right-of-way that threatens overhead lines. Jog the alignment at road crossings and periodically plant materials along the edges of the right-of-way.

Distribution Lines

Power distribution lines shall also be located underground to minimize negative visual impact, reduce maintenance, and protect from terrorist or other enemy attack. If overhead, they shall be located out of view from main public areas or screened to be as unobtrusive as possible. Avoid alignments of overhead lines along major circulation corridors. Place along minor streets, alleyways, or rear lot, and use the vegetation and topography to provide screening to reduce visual impacts. Minimize the number of poles and pole height, and use poles that blend into their surroundings to reduce visual clutter. Poles shall also be multi-functional to accommodate power, telephone, cable television, street lighting, etc. to further reduce visual clutter.

Large trees that will require regular pruning and maintenance shall not be planted under overhead lines.

Substations and Transformers

Substations and transformers shall 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 shall be screened from public view by using plant material, berms, and walls.

Sewer and Water

The sewer and water utilities were leased to American Water Military Services (AW) in March 2009 under a Utilities Privatization Contract with a 50-year lease. AW maintains their own design criteria and specifications that comply with the State of Virginia and the American Water Works Association. All new sewer/water infrastructure must comply with and be reviewed by AW in coordination with the Installation DPW. The following provides general guidelines to minimize negative visual impacts on Fort Belvoir associated with these utilities.

All sewer and water lines shall be underground. Sewage pump stations shall be screened from roads and adjacent facilities by using plant material, berms, walls, and fences. Above ground structures for pump stations shall be constructed in accordance with building guidelines for the area.

A water storage tank that is visually apparent in its form can be used as a focal point or identifying landmark, which can provide a sense of orientation within an installation. If visually obscured, the tank shall be painted to “disappear” or blend into its surroundings. Tanks over 50 years old may be historic structures that may need to be replaced with new ones of similar design.

Fire hydrants shall be highly visible and free of any screening. They shall be yellow in color with luminous paint. Caps shall indicate tested water pressure.

Stormwater Management

Drainage Systems

Installation storm drainage systems shall be appropriate to the character of development they serve.

Guidelines include:

- Storm drainage systems in densely developed areas require curbs, gutters, and underground lines.
- Open grates shall be installed in the roadway so that the grates are perpendicular to the flow of traffic, to ensure bicycle tires do not become entrapped in their openings
- Large hard surfaced parking lots shall have covered drainage at the entry to prevent water draining into adjacent streets.
- Storm drainage systems in low-density areas can utilize drainage swales and ditches that are contoured to be compatible with the natural landform.
- Stormwater conveyance and outfall designs shall not include:
 - Level spreaders
 - Concrete-lined channels/ditches
 - Multiple culverts in a side by side configuration with same bottom elevation. (Use a single culvert at stream flowline for low flows; set additional parallel culverts 6 to 12 inches higher to convey greater flows.)



Curb, gutter and underground storm drainage line in the Historic District.



Bioswale in the OCAR parking lot.

Facilities

All new construction must meet federal, state, and local requirements for stormwater runoff quality and quantity control. These include:

- Energy Independence and Security Act (EISA) of 2007, Section 438
- Virginia Erosion and Sediment Control (VESC) regulations
- Virginia Stormwater Management Program (VSMP) Permit regulations
- Environmental Protection Agency (EPA) Chesapeake Bay Total Maximum Daily Load (TMDL) for Nitrogen, Phosphorus and Sediment
- Fairfax County Public Facilities Manual (PFM)

New construction must provide stormwater management facilities in accordance with the most stringent of these requirements. Generally, compliance with EISA and the VSMP permit regulations will assure that these criteria are met. Fairfax County regulations are generally in accordance with VSMP requirements, but may not be updated to comply with the most recent state requirements.

The VESC and VSMP requirement for adequate outfall mandates that receiving stream channel must have adequate capacity and consideration must be given to the effect of runoff on downstream channels. Many stream channels on the Installation have severe existing erosion issues. Stream restorations have been provided in a limited number of stream channels and have been effective in remediation of eroded channels.



Stormwater management facility at NGA Campus East.



Stream restoration project on Fort Belvoir.

Section 438 of the Energy Independence and Security Act

Section 438 of EISA requires that any development or redevelopment project involving a federal facility with a footprint over 5,000 square feet shall use site planning, design, construction and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the pre-development hydrology of the property with regard to temperature, rate, volume and duration of flow. Implementation can be achieved through the use of low impact development infrastructure tools. Virginia and Fairfax County are expected to update their stormwater regulations to comply with the requirements. Fort Belvoir will comply with the revised Virginia and Fairfax stormwater quantity and quality requirements.

The intent of Section 438 is to restore the pre-development site hydrology. Possible methods include solutions that harvest, infiltrate and evapotranspire runoff, such as green roofs, tree boxes, rain gardens, vegetated swales, bioretention, infiltration planters, porous and permeable pavements, reforestation and re-vegetation, protection of riparian buffers, decentralized harvesting approaches such as rain barrels and cisterns, ground water recharge, and infiltration.

EPA guidance indicates two options to meet Section 438 requirements:

- Retain the 95th percentile rain event, using practices that manage rainfall on-site and prevent off-site discharge from all rainfall less than or equal to the 95th percentile rain event, to the maximum extent technically feasible.
- Develop a site specific hydrologic analysis which would determine pre-developed hydrologic conditions (runoff rate, volume, duration and temperature) and match them by replicating pre-development hydrology. This would use similar methods as described above for infiltration, evapotranspiration and rainwater harvesting.

The two most recent major construction projects on Fort Belvoir, the USALSA and OCAR buildings which began design in September 2010, meet Section 438 by controlling the 95th percentile rainfall event. The Installation will require all future development and redevelopment projects with footprints exceeding 5,000 square feet to meet Section 438. This shall also support compliance with the Chesapeake Bay TMDL criteria.

Chesapeake Bay Total Maximum Daily Loads

Section 303(d) of the Clean Water Act (CWA) and the EPA's Water Quality Planning and Management Regulations require Total Maximum Daily Loads (TMDLs) to be developed for impaired waterbodies. A TMDL establishes the amount of a pollutant that a waterbody can assimilate without exceeding its water quality standard for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources to restore and maintain the quality of the state's water resources.

The EPA established the Chesapeake Bay TMDL to identify necessary pollution reductions across the Mid-Atlantic region to restore clean water in the Chesapeake Bay and the region's streams, creeks and rivers. The TMDL sets pollution limits necessary to meet applicable water quality standards in the Bay and its tidal rivers and embankments. The regulation is designed to ensure that all pollution control measures needed to fully restore the Bay and its tidal rivers are in place by 2025, with at least 60 percent of the actions completed by 2017. The TMDL is supported by rigorous accountability measures to ensure cleanup commitments are met, including short- and long-term benchmarks, a tracking and accountability system for jurisdiction activities, and federal contingency actions that can be employed if necessary to spur progress. Fort Belvoir will comply with the TMDL regulations as set forth by the EPA.

Stormwater Management Strategies and Design Methods

The following section shall be considered when designing for new projects.

Site Selection. Site selection for new construction shall consider stormwater management requirements. Development on existing undeveloped, relatively pervious areas will significantly increase site runoff and is likely to require extensive stormwater management facilities. Redevelopment of existing fully developed areas may reduce imperviousness and reduce the need for on-site stormwater management facilities or downstream stream restoration.

Expansion. Stormwater management facilities shall be designed to allow for future expansion to serve additional development in the watershed.

Regional Facilities. The Installation continues to pursue funding for stream restorations and for regional stormwater management facilities to serve multiple development sites if the sites meet regulations and quality. Designs for new stormwater management facilities shall coordinate with the Installation to determine if regional or combined facilities are feasible.

Access. Stormwater management design generally follows Fairfax County Public Facilities Manual (PFM) requirements described in Section 6: Storm Drainage. In accordance with PFM Section 6-1306 Maintenance Design Considerations, SWM facilities "including wet ponds, underground chambers, etc., shall provide accessibility with an all weather vehicular access way with a minimum 12-foot wide surface. Surfaces may be made of geosystems such as Geogrid, Grassrings, Geoweb, or Grasscrete or may be made of asphalt, concrete or gravel." Fort Belvoir DPW will consider the specific situation and physical conditions when approving the surface materials and access ways to support the anticipated maintenance vehicles. In accordance with PFM Section 6-1606, safety considerations for wet ponds shall include shallow benches along shoreline and safety signs.

Low Impact Development. LID is a stormwater management strategy concerned with maintaining or restoring the natural hydrologic functions of a site to achieve natural resource protection objectives and fulfill environmental regulatory requirements. LID incorporates a set of overall design strategies as well as highly localized, small-scale, decentralized source control techniques known 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.

Runoff Reduction Method. The Runoff Reduction Method focuses on determining the capacity of various types of BMPs (stormwater quality control methods) to reduce the overall volume of runoff as well as pollutant removal. The BMPs include conventional and innovative practices (e.g., permeable pavement, sheet flow to filter areas or open space, vegetated roofs, downspout disconnection, etc.). The method also incorporates built-in incentives for environmental site design, such as forest preservation and the reduction of soil disturbance and impervious surfaces. The method was tested in numerous site plan workshops held across Virginia by the Department of Conservation and Recreation (DCR) and the Virginia Chapter of the American Society of Civil Engineers, and has been refined in response to comments received. This method was adopted into the Virginia Stormwater Management Regulations in September 2011, and designers must utilize this method, in addition to standard stormwater calculations, to ensure maximum reduction of pollutants. More information can be found at The Center for Watershed Protection (<http://www.cwp.org>).

The method identifies three types of strategies:

- Practices that reduce runoff volumes but do not reduce pollutants (quantity control).
 - Vegetated roof, sheet flow to open space or filter, some rooftop disconnects.
- Practices that remove pollutants and reduce runoff volumes (quantity and quality control)
 - Some rooftop disconnects, grass channel, permeable pavement, bioretention, infiltration, extended detention pond, dry swale.
- Practices that remove pollutants but do not reduce runoff volumes (quality control).
 - Manufactured BMP, constructed wetland, dry pond, filtering practices, wet swale.

The Runoff Reduction Method uses Total Phosphorus (TP) as the target pollutant for compliance with Virginia Water Quality criteria (4 VAC50-60-63 through 65). Total Nitrogen (TN) is also calculated, and BMP designs address TN removal, as well as the removal of other stormwater pollutants.

There are three steps:

- Apply site design practices to minimize impervious cover, grading and loss of forest cover.
- Apply Runoff Reduction (RR) Practices. In this step, the designer experiments with combinations of nine RR practices on the site. The designer is encouraged to use RR practices in series within individual drainage areas (such as rooftop disconnection to a grass swale to a bioretention area) in order to achieve a higher level of runoff reduction
- Compute Pollutant Removal (PR) by selected BMPs. In this step, the designer uses the spreadsheet to see whether the phosphorus load reduction has been achieved by the application of RR practices. If the target phosphorus load limit is not reached, the designer can select additional, conventional BMPs -- such as filtering practices, wet ponds, and stormwater wetlands -- to meet the remaining load requirement.

Stormwater Management Maintenance Considerations. The installation has allowed a number of new innovative SWM facilities in order to meet regulatory standards and to ensure sustainable SWM best practices for the long term. Given the wide range of options available to the design teams that can be successful for any one project, it is important that DPW and ENRD staff are engaged early on to assess maintenance considerations when choosing the type of system or systems to be built. Where possible, new projects should always take into account future growth in the watershed when selecting SWM locations, facility expansion, storm sewer line or channel sizes, outfall improvements, etc. A comprehensive watershed approach that lends itself to “regional” type SWM facilities is often the preferred for maintenance purposes.

Step 1: Environmental Site Design (ESD)	Step 2: Runoff Reduction (RR) Practices	Step 3: Pollutant Removal (PR) Practices
Forest Conservation	Sheetflow to Conserved Open Space	Filtering Practice
Site Reforestation	Rooftop Disconnection:	Constructed Wetland
Soil Restoration (combined with or separate from rooftop disconnection)	<ul style="list-style-type: none"> – Simple – To Soil Amendments – To Rain Garden or Dry Well – To Rain Tank or Cistern 	Wet Swale
Site Design to Minimize Impervious Cover & Soil Disturbance	Green Roof	Wet Pond
	Grass Channels	
	Permeable Pavement	
	Bioretention	
	Dry Swale (Water Quality Swale)	
	Infiltration	
	Extended Detention (ED) Pond	

Note: Practices listed above achieve both Runoff Reduction (RR) and Pollutant Removal (PR) functions and can be used for Steps 2 and 3.

Exterior Lighting

Lighting systems must correspond with set standards that govern type, usage, and location of light fixtures. These policies ensure compatibility and efficiency. Architects, planners, landscape architects, engineers, and other designers shall consult the latest lighting standards and policies published by DoD, Army, Federal, State, Local, and/or Industry. The reader is directed to review:

- Illumination Engineering Society's (IES) Lighting Handbook
- A Guide to Fairfax County's Outdoor Lighting Standard
- Technical Manual 5-803-5 Installation Design and 5-811-1 Electrical Power Supply and Distribution
- UFC 3-530-01 Design: Interior and Exterior Lighting and Controls
- ANSI/IESNA RP-8-00 Roadway Lighting

These documents will offer greater in-depth knowledge and information than can be obtained in this IPS. The purpose of this information is to give a brief synopsis of the breadth and complexity of lighting design.

Not all lighting fixtures and design standards are addressed within this document because specific circumstances require specialized lighting design. Such specialized design requires customized light selection and implementation that cannot be generalized within this document. These special circumstances include and are not limited to:

- Athletic facilities lighting
 - Exterior lighting associated with athletic facilities (e.g., sports courts and fields) shall be compatible with the function and aesthetics of the athletic facility and reviewed by the Installation DPW during the project design phase and prior to installation.
- Security lighting
 - Metal halide and LED wall packs must have photo sensors and astronomical time clocks integrated to control light pollution and usage.
 - See UFC Security Engineering: Entry Control Facilities/Access Control Points 4-022-01 for guidance.
- ACP lighting
 - See UFC 4-022-01 for guidance.
- Custom lighting (custom lighting is subject to DPW review and approval).
- Pedestrian walkway and accent lighting (e.g., building entrance lighting, lighted bollards, up-lighting) shall match the architectural style of the facility and context of the district. These lights shall be reviewed by DPW during the project design phase and prior to installation for compatibility.

- Solar-powered lights shall be integrated where feasible on roadway and parking lot light poles; however, these are not allowed within the historic district to maintain visual continuity and meet cultural resource regulations.

All lighting plans shall be reviewed by the DPW, security personnel, Force Protection Officer, and facility users to assure that the lighting design complies with current standards and regulations.

Goals

The objective of the lighting plan is to develop a policy that achieves three goals:

- Protect character of Fort Belvoir by implementing light fixtures that complement the existing adjacent facilities and fixtures; and contribute to the overall identity of the Installation.
- Eliminate or minimize the amount of ambient light produced on-Post that might infiltrate historic and adjacent properties; produce unwanted glare; and disrupt natural ecosystems
- Favor energy efficiency and quality products. Selecting lighting products of higher quality also promotes longevity, durability, and ease of operation and maintenance.

Lamp Characteristics

Selection of a lamp involves evaluating its optical control, efficiency, color rendition, life, cost, and maintenance. The following summarizes the characteristics of seven typical lamp types; those with asterisks are not suitable for installation on Fort Belvoir. Recommended light styles for each type appear in Figures 6.15 and 6.16 and Tables 6.7 and 6.8 for roadways and districts.

Incandescent *

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

High Pressure Sodium

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

Low Pressure Sodium *

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

LED Module

- Superior color rendition
- Good optical control
- Long life span
- Reduced maintenance and material costs
- Initial cost expensive, but long-term usage savings

Fluorescent *

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

Mercury Vapor *

- Good color rendition
- Good foliage lighting
- Good life span
- Good efficiency
- Inexpensive
- Poor energy efficiency
- Displaces excess heat
- Disposal may be problematic

Metal Halide

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

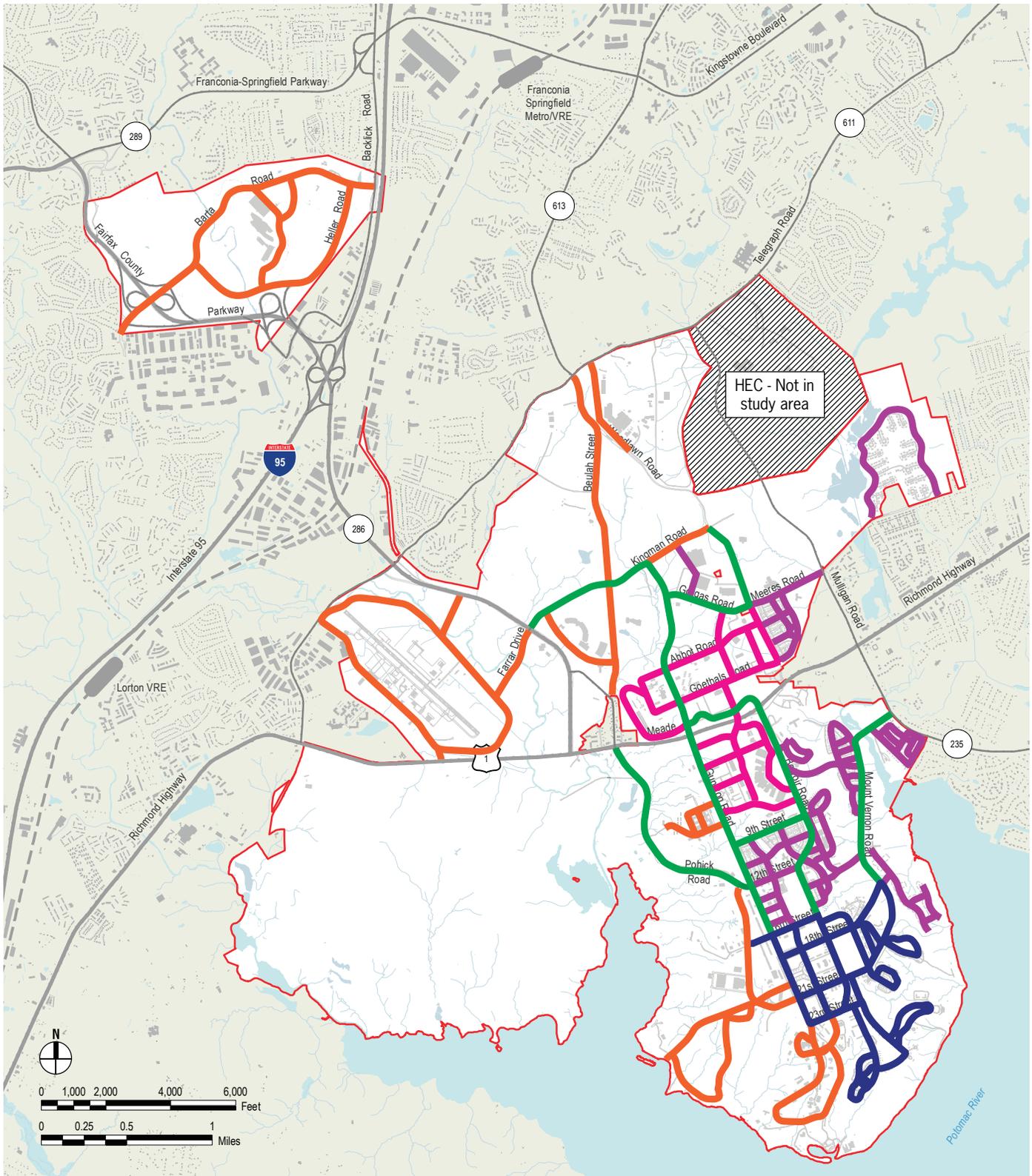
Roadway Lighting

The purpose of roadway lighting is to attain a level of visibility which enables the motorist and pedestrian to see quickly, distinctly, and with certainty all significant detail, notably the alignment of the road (its direction and its surrounds) and any obstacles on or about to enter the roadway. Good visibility under day or night conditions is one of the fundamental requirements enabling motorists to move on roadways in a safe and coordinated manner. Properly designed and maintained roadway lighting will produce conformable and accurate visibility at night, which will facilitate and encourage both vehicular and pedestrian traffic. Elements to consider when designing and implementing roadway lighting include:

- Promotes safety at night by providing quick, accurate, and comfortable visibility for drivers and pedestrians.
- Improves traffic flow at night by providing light, beyond that provided by vehicle lights, which aids drivers in orienting themselves, delineating roadway geometries and obstructions, and judging opportunities for overtaking.
- Enhances properties (especially commercial/retail areas) by attracting evening shoppers, audiences, and other users.
- Placement shall be based upon geometry, character of roadway, physical features, environment, available maintenance, economics, aesthetics, and overall lighting objectives.
- Space lights at a consistent interval along the roadway for uniformity in lighting.
- Style of lighting shall blend with the context, function, and capacity of the roadway (Figure 6.1 and Table 6.2).
- Use photosensors, astronomical time switches or a combination of both to control roadway lighting. Controls must be configured to automatically turn on exterior lighting at dusk and turn off the exterior lighting when sufficient daylight is available or the lighting is not required.
- Historic lamps and posts shall be salvaged and stockpiled when removed from areas outside the historic district to be reused in the historic district with future projects or for replacement of damaged fixtures and poles.
- Complete a photometric study to ensure roadway lighting meets visibility and recommended safety levels.
- Refer to UFC 3-530-01 (Chapter 8: Exterior Applications) and IESNA RP-8-00 Roadway Lighting documents for lighting controls along roadways.

Table 6.2 summarizes the light fixtures and poles recommended for the roadways on Fort Belvoir. Figure 6.1 shows which roadways correlate with the recommendations in the table.

Figure 6.1: Roadway Lighting Plan



- █ Decorative Lamp & Post
- █ Historic Lamp & Post
- █ Residential Lamp & Post
- █ Contemporary Lamp & Post
- █ Utilitarian Lamp & Post

Table 6.2: Roadway Lighting

Decorative Lamp and Post



Philips Hadco or approved equal (Luminaire)
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

PLP Composite Technologies, Inc. or approved equal (Pole/Base)
 57 Creamery Road / P.O. Box 429
 Fitzwilliam, NH 03447
 Tel: (800) 262-6075
 www.plpcomp.com

Specifications	
Fixture & Style	C5459E Luminaire / Baltimore Series Post & Base
Height	20' - 30'
Spacing	40' - 120'
Lumens	80 total LEDS (100 Lumens/Watt ea.)
Cutoff Class	Cutoff
Lamp	LED Module
Finish	Cast Aluminum - Black

Historic Lamp and Post



Philips Hadco or approved equal (Luminaire)
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

Ameron International or approved equal (Pole/Base)
 5851 Thille Street, Suite 101
 Ventura, California 93003
 Tel: (805) 676-3282
 www.ameron.com

Specifications	
Fixture & Style	C8865 Luminaire / Victorian III - Style III
Height	12'
Spacing	20' - 60'
Lumens	80 total LEDS (100 Lumens/Watt ea.)
Cutoff Class	Cutoff
Lamp	LED Module
Finish	Concrete pole w/ cast aluminum luminaire - Black

Residential Lamp and Post



Hanover Lantern, Inc. or approved equal
 350 Kindig Lane
 Hanover, PA 17331
 Tel: (717) 632-6464
 www.hanoverlantern.com

Specifications	
Fixture & Style	6734BP-ARB / #360 Aluminum pole
Height	12' - 14'
Spacing	20' - 60'
Lumens	5,000
Cutoff Class	Cutoff
Lamp	Mercury Vapor or High Pressure Sodium
Finish	Aluminum - Black

Contemporary Lamp and Post



Lighting Science Group Corporation or approved equal (Luminaire)
 1227 S. Patrick Drive - Bldg. 2A
 Satellite Beach, FL 32937
 Tel: (877) 999-5742
 www.lsgc.com

Philips Hadco or approved equal (Pole/Base)
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

Specifications	
Fixture & Style	Shoebox / CP6736 5" Square aluminum pole
Height	20' - 30'
Spacing	20' - 60'
Lumens	6,765
Cutoff Class	Full Cutoff
Lamp	LED Module
Finish	Aluminum - Black/Dark Bronze

Utilitarian Lamp and Post



Howard Lighting Products or approved equal (Luminaire)
 P.O. Box 1590
 Laurel, MS 39441
 Tel: (800) 956-3456
 www.howardlightingproducts.com

Philips Hadco or approved equal (Pole/Base)
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

Specifications	
Fixture & Style	ALM2-LED Series / CP6736 5" Square aluminum pole
Height	20' - 30'
Spacing	40' - 120'
Lumens	80 total LEDS (90 Lumens/Watt ea.)
Cutoff Class	Full Cutoff
Lamp	LED Module
Finish	Aluminum - Black/Dark Bronze



Traditional lamp and post in the Town Center



Contemporary lamp and post at the Warrior in Transition Center

Parking Lot Lighting

Parking lot lighting encompasses the light fixtures and poles implemented in open air/surface parking lots on Fort Belvoir to create a safe environment by providing visibility during hours of darkness. The purpose of this section is to regulate exterior lighting in surface/open air parking lots to avoid unsafe and unpleasant conditions, conserve light and energy, discourage excessive use, and regulate the type of fixture and pole. The following general recommendations provide guidance when designing for and implementing parking lot lighting:

- Minimize parking lot lighting trespass onto adjacent areas.
- Minimize light spill into the dark night sky.
- Design parking lot lighting to avoid harsh contrasts in lighting levels.
- Fixtures and lighting systems used for safety and security shall be in good working order and shall be maintained in a manner that serves the original design intent of the system.
- Provides adequate vision, comfort and safety for the users.
- Provides uniform lighting throughout the facility with no dark patches or pockets.
- Matches the architectural style and context of the site to maintain visual uniformity and continuity.
- Use the recreational lamp and post within the Tompkins Basin area for recreational type facilities; otherwise, use the residential lamp and post for parking areas within the recreational district (Table 6.3).
- Complete a photometric study to ensure parking lot lighting meets visibility and recommended safety levels.
- Where practical, parking lot lighting installations shall include timers, dimmers, sensors, or photocell controllers that turn the lights off during daylight hours or hours when lighting is not needed, to reduce overall energy consumption and eliminate unneeded lighting.
- County's policies (full cutoff lighting, eliminate light intrusion to adjacent historic policies, off-post as well as on-post, coordinated with CRM

- On all non-residential lots which contain a minimum of four parking lot light poles, parking lot lighting levels for ground surface parking lots and the top levels of parking decks or structures must be reduced by at least 50 percent of full operational levels within 30 minutes after the close of business. Lighting levels may be reduced by turning off 50 percent of the parking lot lights or by dimming parking lot lighting levels to no more than 50 percent of the levels used during business or activity hours within 30 minutes of the close of business, or by some combination thereof. Given that a certain minimum lighting level is recommended for safety and security purposes, this provision does not require parking lot lighting levels to be reduced to less than 0.2 footcandles as measured horizontally at the surface on which the light pole is mounted.

Table 6.3 summarizes the fixture and post type recommended for use in each district (Figure 6.2). The historic lamp and post has two options for the luminaire depending on the location of the project. Within the historic district, the historic luminaire and concrete pole is recommended; adjacent to the historic district, a combination of contemporary luminaire and concrete pole is acceptable.

Iconic districts, as shown in Figure 6.2, depict those campuses that have unique exterior and parking lot lighting including FBNA, Intelligence District, DLA/INSCOM District, and Medical District. When designing for projects within these districts, the exterior and parking lot lighting shall match the existing lighting to maintain visual uniformity.

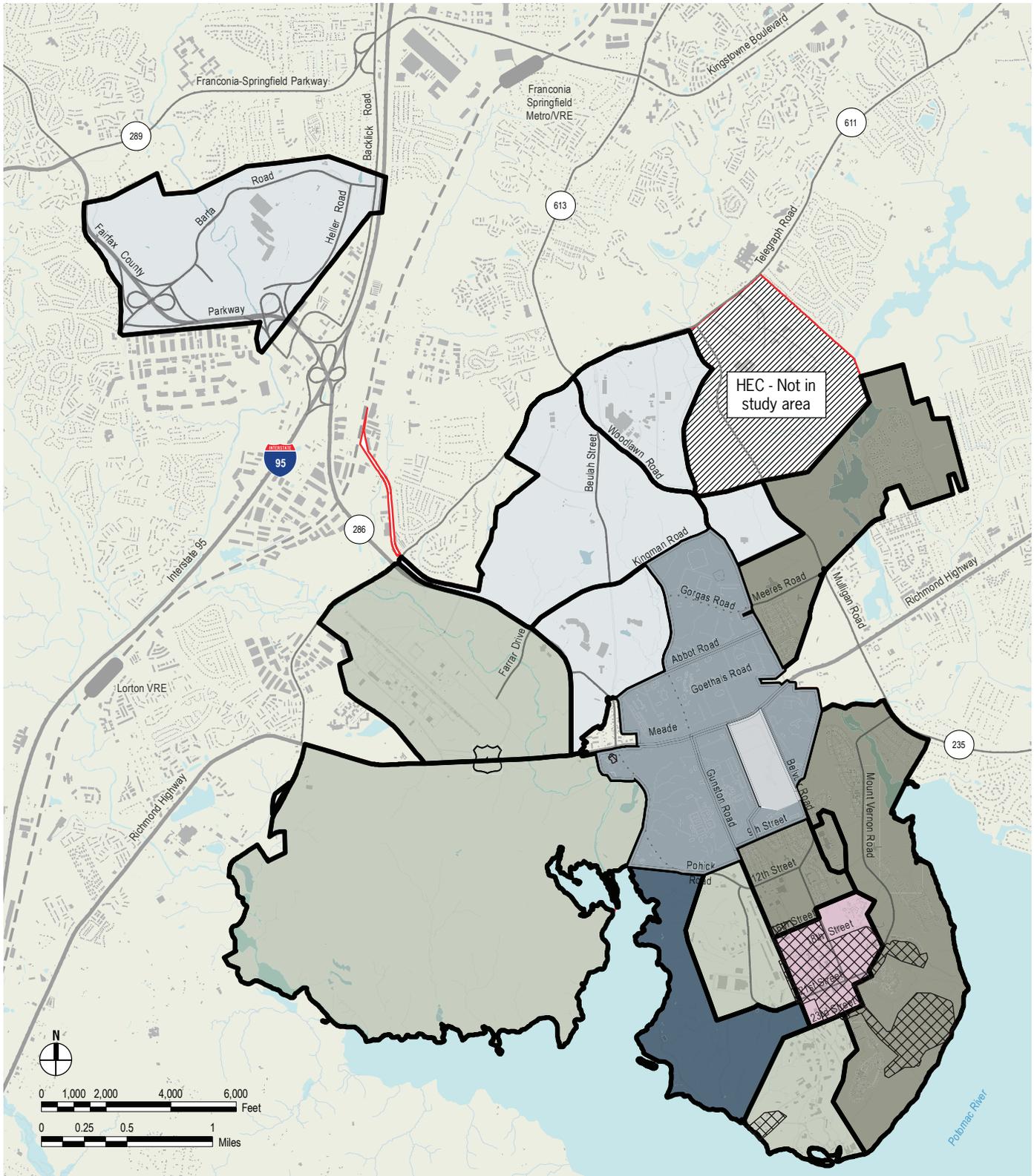


Parking structures lighted internally with ceiling-mounted fixtures.



Tenant campuses such as the Defense Logistics Agency have a unique lamp and pole that compliments a specific design aesthetic.

Figure 6.2: Parking Lot Lighting Plan



- | | | | | | |
|---|--------------------------|---|--------------------------|---|---------------------------|
|  | Historic Lamp & Post |  | Contemporary Lamp & Post |  | Historic District Overlay |
|  | Residential Lamp & Post |  | Utilitarian Lamp & Post | | |
|  | Recreational Lamp & Post |  | Iconic Lamp & Post | | |

Table 6.3: Parking Lot Lighting

Historic Lamp and Post



Philips Hadco or approved equal (Luminaire)
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

Lighting Science Group Corporation or approved equal (Contemporary Luminaire)
 1227 S. Patrick Drive - Bldg. 2A
 Satellite Beach, FL 32937
 Tel: (877) 999-5742
 www.lsgc.com

Ameron International or approved equal (Pole/Base)
 5851 Thille Street, Suite 101
 Ventura, California 93003
 Tel: (805) 676-3282
 www.ameron.com

Specifications	
Fixture & Style	C8865 Luminaire / Victorian III - Style III or Shoebox / Victorian III - Style III
Height	12'
Spacing	20' - 60'
Lumens	80 total LEDS (100 Lumens/Watt ea.)
Cutoff Class	Full Cutoff
Lamp	LED Module
Finish	Concrete pole w/ cast aluminum luminaire - Black or Concrete pole w/ contemporary luminaire - Black



Residential Lamp and Post



Hanover Lantern, Inc. or approved equal
 350 Kindig Lane
 Hanover, PA 17331
 Tel: (717) 632-6464
 www.hanoverlantern.com

Specifications	
Fixture & Style	6734BP-ARB / #360 Aluminum pole
Height	12' - 14'
Spacing	20' - 60'
Lumens	5,000
Cutoff Class	Cutoff
Lamp	Mercury Vapor or High Pressure Sodium
Finish	Aluminum - Black

Recreational Lamp and Post



Philips Hadco or approved equal
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

Specifications	
Fixture & Style	Lumilock LED GX1 5000K / P1600 Aluminum Pole
Height	12' - 14'
Spacing	20' - 60'
Lumens	80 total LEDS (100 Lumens/Watt ea.)
Cutoff Class	Full Cutoff
Lamp	LED Module
Finish	Aluminum - Black

Contemporary Lamp and Post



Lighting Science Group Corporation or approved equal (Luminaire)
 1227 S. Patrick Drive - Bldg. 2A
 Satellite Beach, FL 32937
 Tel: (877) 999-5742
 www.lsgc.com

Philips Hadco or approved equal (Pole/Base)
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

Specifications	
Fixture & Style	Shoebox / CP6736 5" Square aluminum pole
Height	20' - 30'
Spacing	20' - 60'
Lumens	80 total LEDS (100 Lumens/Watt ea.)
Cutoff Class	Full Cutoff
Lamp	LED Module
Finish	Aluminum - Black/Dark Bronze

Utilitarian Lamp and Post



Howard Lighting Products or approved equal (Luminaire)
 P.O. Box 1590
 Laurel, MS 39441
 Tel: (800) 956-3456
 www.howardlightingproducts.com

Philips Hadco or approved equal (Pole/Base)
 100 Craftway / P.O. Box 128
 Littlestown, PA 17340
 Tel: (717) 359-7131
 www.hadco.com

Specifications	
Fixture & Style	ALM2-LED Series / CP6736 5" Square aluminum pole
Height	20' - 30'
Spacing	40' - 120'
Lumens	80 total LEDS (90 Lumens/Watt ea.)
Cutoff Class	Full Cutoff
Lamp	LED Module
Finish	Aluminum - Black/Dark Bronze

Signage

Signs are used to visually communicate information. They are highly visible features that shall 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 are found in Technical Manual (TM) 5-807-10, Signage.

Fort Belvoir DPW manages all exterior signage requests and installation to ensure that consistency and standards are maintained across Fort Belvoir. During design and review, new facility designs will include a signage design package for DPW review consistent with the minimum standards contained in this document. Requests for additional or replacement signage by mission partners must be submitted to the DPW using Form 4283 (Work Order Request), and the appropriate review will be applied. Certain types of signage are regulated by Garrison Commander Policy such as reserved parking signs. This is addressed later in this section.



Installation entrance sign at Belvoir Road and U.S. Route 1.

Sign System Characteristics

There are several basic design characteristics that are an integral part of any successful signage system. When applied, they ensure that information is clearly and attractively conveyed. The characteristics include:

- **Simplicity.** An effective signage strategy provides only needed information, avoids redundancy, and eliminates over-signing that results in clutter and visual confusion. Sign messages must be clear, simple, and easy for motorists to process quickly.
- **Continuity.** It is essential that the signage 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 type styles.
- **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.
- **Legibility.** Sign type style, line spacing, color, and size all combine to create the crucial design characteristics of legibility. This aspect of sign design shall take into consideration users such as motorists, pedestrians, or bicyclists, and the relative traveling speed of each user type when viewing the signs.
- **Context sensitive.** Lighting of signs shall be sympathetic to the surrounding property. Uplighting of signs shall be avoided unless absolutely necessary in order to limit glare and light pollution.



Organizational identification sign for the PEO building.

Information/Identification Signs

These signs identify entrances to the Installation, areas within the Installation, major mission partners, buildings, and organizational or functional components. They identify a location and greet the visitor. They shall be compatible in scale, color, finish, and character with adjacent facilities and blend with the natural surroundings. The design guidelines for informational signs include:

Typeface

- Building/Organization Title: Match to existing
- Building Addresses: Match to existing
- Building Numbers: Match to existing

Color

- Panel: Dark Brown (Belvoir Brown)/Bronze
- Lettering: White
- Post: Dark Brown (Belvoir Brown)
- Exposed panel backs and edges: Dark Brown (Belvoir Brown)
- All paint: Semi-gloss

Materials

- Panel:
 - High Density Urethane (Foam Core)
 - Redwood
 - 1/8" thick aluminum
- Post:
 - Steel Pipe
 - 6" x 6" wood post
- Foundation:
 - Concrete pier or direct burial

As described in Chapter 3, Campus/Iconic buildings are unique in architectural style and form; therefore, the signage associated with these facilities shall be unique as well. Because these facilities are on large land parcels normally set apart from the main Post, the identifying signs may not conform to the Fort Belvoir identification signage standards. The Campus/Iconic building signs shall complement the architectural style of the facilities and impart an importance as to the significance of the identified mission partner.



Installation Entrance Sign (Pence Gate).

Installation Identification Signs

- Installation identification signs name the installation and display the official U.S. Army plaque. 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 U.S. Army plaque, with the words "United States Army, Fort (Name of Fort), and gate name. The placement of the Senior Mission Commander logo, the 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 motto, names, and titles of individuals are not to be displayed.
- Installation identification signs consist of three types:
 - Sign type A1 – Main entrance sign that identifies the principal visitor entrance.
 - Sign type A2 – Secondary entrance sign that identifies entry points with relatively high volumes of visitor traffic.
 - Sign type A3 – Limited access entry gate sign that identifies entry points with limited public access.
- See TM 5-807-10, Signage, paragraph 3-3 for sign specifications, and paragraph 3-11 for sign placement guidelines.

Building Identification

Buildings at Fort Belvoir require three types of exterior identification sign types: organizational identification, Fort Belvoir facility number, and street address.

Organizational Identification

Organizations at Fort Belvoir range from major commands occupying entire buildings to small units located in multi-mission partner facilities. Signage identifying these organizations is commensurate with their size, mission, and location on-Post. Garrison Directorates and functional facilities, major mission partners, and mission partners occupying entire buildings will have a free-standing, monument sign located in front of the main entrance and visible to the nearest street. The sign shall contain the organization's name along with the logo or symbol of their major command. Where more than two organizations occupy the same building, the primary occupant will be placed on the monumental sign. Any deviation must be approved by DPW. The sign material can be redwood or high density urethane (foamcore) and adhere to the configuration shown in Figure 6.3. Signs of different sizes or configuration may be allowed under special circumstances. The signs shall be mounted using 6 inch x 6 inch wood posts with concrete footings.



Figure 6.3: Organizational Identification Sign

Smaller units or mission partners in a multi-mission partner building shall have a building-mounted sign indicating their organization's name and other pertinent information. These signs will be metal, preferably aluminum, but have the same overall color and format as the monument signs.



Figure 6.4: Smaller Organization Identification Sign

Fort Belvoir Facility Number

Fort Belvoir assigns a unique facility number to each structure on the Post to comply with Army real property regulations. The facility number sign shall be metal, mounted to the side of a facility, and visible from the most accessible direction. The facility number sign shall be mounted at the top of the first level elevation. Buildings shall have facility number signs mounted on a minimum of two sides facing the predominant streets, and located high enough to be visible above landscaping or surrounding structures. Buildings with multiple street elevations may require more than two facility number signs.

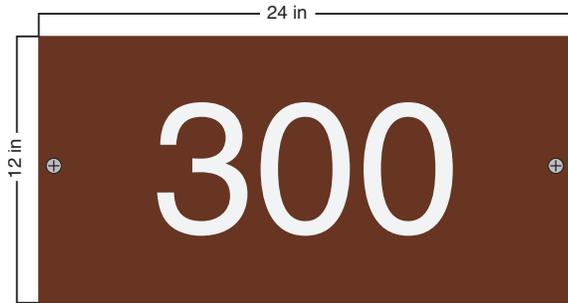


Figure 6.5: Facility Number Identification Sign



Facility Number (Fort Belvoir)



Facility Number (Fort Belvoir)

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 addresses shall be assigned so they are compatible with the United States Postal Services automated delivery point sequencing.
- The DoD installation is responsible for assigning city-style street addresses on the Installation.
- Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee.
- Only geographically locatable civilian style street addresses (such as 4102 Cindy Avenue) shall be used.
- Addresses such as “Building 123 Roberts Street” are not a valid address format and shall not be used.
- Place addresses by the front entrance of the building so they can be seen.
- Place only the street address number on the building so both are visible from the street.
- Buildings shall have the address number and street name centered above the main entrance or located to the right side.

Housing Areas

- Signage in the residential housing areas is managed by Fort Belvoir’s privatized housing partner, Clark Pinnacle, under a 50-year lease that began in December 2003.



Street Sign (Fort Belvoir)

Street Signs

Street name identification signs will have the same lettering typeface and color as the other Fort Belvoir identification signs.

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. The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. A maximum of six lines of information excluding the title shall be delineated on each sign.

With regard to directional signage, priority is given to visible landmarks and those destinations most sought by first-time or infrequent visitors, as opposed to destinations routinely sought by Post personnel. Design guidelines include:

Typeface

- Match to existing

Arrow

- Place at end indicating direction.
- Stroke width: Match to existing

Color

- Panel: Dark Brown (Belvoir Brown) / Bronze
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown (Belvoir Brown) / Bronze
- All paint: Semi-gloss

Materials

- Panel:
 - Double-face 1/8" thick aluminum
- Post:
 - Steel Pipe or
 - 6" x 6" wood post
- Foundation:
 - Concrete pier or direct burial

Directional signs for Campus/Iconic facilities identified in Chapter 3 may vary in color and style from the standards outlined above to match the architectural style and form of these unique buildings. Signage shall complement the architectural style and detailing of the adjacent Campus/Iconic facilities and surrounding campus.



Directional sign posting general guidance instruction.

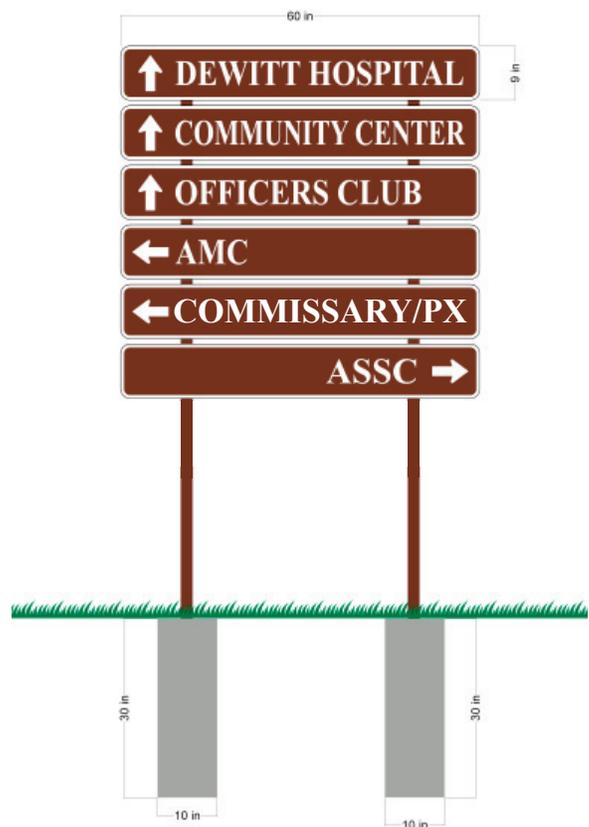


Figure 6.6: Directional Sign Diagram



Regulatory speed limit sign (FBCH).



Handicap Parking Signs (Fort Belvoir).

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. Related to these signs are pavement markings and traffic signals. These signs are designed to include the following:

Typeface

- Match to existing

Color

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown (Belvoir Brown) / Bronze
- Exposed panel backs and edges: Dark Brown
- All paint: Semi- gloss

Materials

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

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, Signage.

Traffic Control Signs

- National highway standards will be used for signs that regulate vehicular traffic on a CONUS installation (AR 420-72, Transportation Infrastructure and Dams, Paragraph 2-15f). These standards are described in the Manual of Uniform Traffic Control Devices (MUTCD). Also see Military Traffic Management Command (MTMC) Pamphlet 55-14, Traffic Engineering for Better Signs and Markings. This pamphlet clarifies existing standards and provides definite guidelines on how to conform to the MUTCD. These standards shall be used installation-wide, including at ACPs.
- Garrison Commander Policy Memorandum regulates the use and granting of reserved parking spaces and signs.

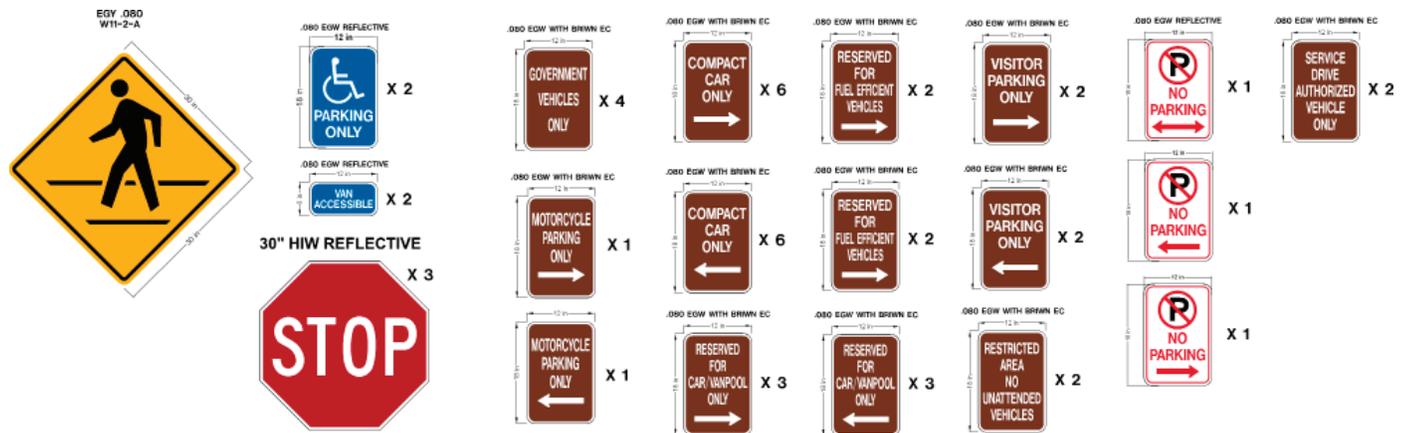


Figure 6.7: Standard Regulatory Signs



Electronic Sign (Fort Belvoir).



Promotional and Marketing Sign.

Electronic Signs

Lighting/Color Restrictions

- Lettering shall be white, blue, or yellow in color. Only one color shall be used per segment displayed. Red lettering will only be accepted in cases where an existing sign cannot provide white, yellow or blue.
- Lettering will be featured on a light field with all other diodes off to create a black background. Signs will not feature background lighting of any kind. (Example: Yellow text on a blue lighted background field is not acceptable.)
- Electronic signs are not permissible within the boundaries of the historic district.
- Any sign supporting a historic property or adjacent to the Fort Belvoir Historic District will utilize only white lettering.

Image/Graphic Restrictions

- Electronic signs will not feature any graphics or animations of any kind.

Hours of Operation

- Electronic signs shall only be in operation during the working hours of the organization/agency/building for which they provide service. Approval and coordination of operation hours shall be coordinated with the DPW.
- Further operation and cutoff requirements may be required if such signage is located adjacent to the Fort Belvoir Historic District.

Text Requirements

- Lettering shall be five inches in height and shall be matched to existing.

Foundation/Mount Structure Design

- Signs shall approximate the quality of materials, designs, and workmanship of surrounding architecture and shall be linked to particular building colors and/or materials.
- The massing and scale of proposed signs shall be consistent with the adjacent structures.
- All designs shall be completed in accordance with the IPS and approved by the DPW before execution.

Safety Requirements

- Electronic signs will be located along roadways in such a way as to not create a safety hazard for motorists or pedestrians.
- All LED sign proposals must be reviewed by the Fort Belvoir Directorate of Emergency Services (DES) and DPW.
- Signs shall be placed at a 90 degree angle for maximum visibility and read time.
- Shall an LED sign cause undue glare on adjacent properties or from the adjacent corridor, the light levels shall be dimmed and maintained at the reduced level.

Promotional and Marketing Signs

All mission partners on Fort Belvoir, DoD or private, who wish to install permanent or temporary signs on the exterior of the facility, on the interior, but visible from the street, or on the facility site that promotes the use of their services or facility shall submit the request to the DPW for review and approval.

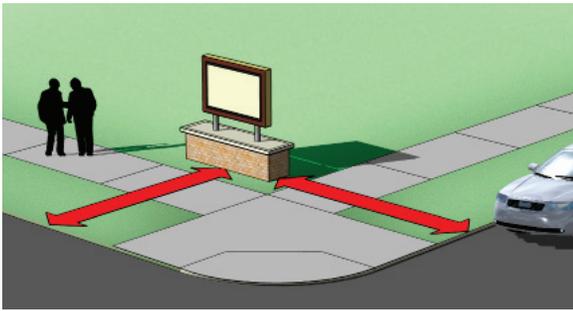


Figure 6.8: Sign Placement Diagram

Sign Placement

Although placement of signs may vary by sign type and specific site conditions, general placement guidelines for most signs include:

- Do not place more than one sign at any location. Traffic signs are the exception to this rule.
- Place signs in areas free of visual clutter and landscape materials.
- Locate signs to allow enough time for users to process and react to the message (Figure 6.8).
- Do not block sight lines at intersections.
- Place signs approximately 7 feet above ground level (measured from the bottom of the sign to the top of the curb) and mounted at right angles to the direction of, and facing, the traffic that they are intended to serve. Provide proper placement to avoid creating a hazard for children.
- Lateral offset is a minimum of 6 feet measured from the edge of the shoulder, or 12 feet measured from the edge of the traveled way for signage placement. See Section 2A.19 of the MUTCD for lower minimums that may be used in urban areas, or where lateral offset space is limited.

Sign System Typography

- **Military Emblems.** The Army has a rich tradition of military heraldry. Military emblems are an important part of the Soldiers' identity, and have been carefully crafted over the years to express unit pride and the unique history and function of the unit. Incorporating 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.

- **Department of the Army Plaque.** The plaque shall be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be reproduced in full color and in accordance with AR 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques.
- **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.

Location Maps

- The location map is an integral element of an installation entrance. It provides both information and sense of place. Its design and construction shall be of compatible architectural style and materials found throughout the Installation.
- Design characteristics to include in a location map are:
 - Plexiglas covered map for protection
 - Architectural materials compatible with the overall Installation
 - Paved walk-up area
 - Litter receptacle
 - Adjacent parking
 - Current takeaway maps



Location map depicting residential villages on-Post (along 12th Street, Fort Belvoir).

Site Furnishings

Site furnishings include all of the utilitarian outdoor amenities found on an Installation. These outdoor furnishings shall be located in coordinated clusters to provide inviting areas of multi-furnishing amenities, and avoid a haphazard arrangement of randomly placed elements. All furnishings shall be accessible to, and usable by, persons with disabilities, in accordance with the requirements of the ADAAG and the UFAS, with the most stringent standards to apply in the event of conflicts. Site furnishings addressed in this chapter include:

- Seating
- Tables
- Shelters
- Trash and Recycling Receptacles
- Urns
- Movable Planters
- Bicycle Racks
- Bollards

Site Furnishing Guidance

This section provides guidance on the type, design, and placement of site furnishings within each district. Recommendations shall be followed when planning for and installing site furnishings with future projects.

Seating

Seating includes benches, seat walls, tables and movable chairs, and picnic tables. Discussed here are the overall guidelines for the seating elements.

Benches

- **Bench Location.** Benches shall be located in areas of high pedestrian use and arranged to encourage socialization within a pleasant outdoor setting. These locations include pedestrian nodes along primary walkways, major building entries, courtyards, and bus stops.
- **Bench Sites.** Benches shall be sited on concrete pads adjacent to walkways. Provide proper clearance around benches (a minimum two foot setback from adjacent sidewalks and a minimum of five feet between front of bench and any stationary obstacle). Provide appropriate planting treatment for visual definition and seasonal shade.

- **Bench Design.** The selection of a bench design for any project is based upon the district in which the project is located. Standard bench size shall be six feet long. Bench dimensions shall meet specifications presented in the Technical Manual (TM) 5-803-5, Installation Design Manual. Wall-mounted benches shall be similar in style and color to the free-standing benches used within a visual zone.

Seating Walls

- **Seating Wall Location.** Seating shall be incorporated into planter boxes or retaining walls, particularly at building entrances, and integrated into the overall area design and pedestrian circulation system.
- **Seating Wall Design.** Seating walls shall generally be between 18 inches and 22 inches high, 12 inches to 18 inches wide, and constructed to complement or match materials of adjacent buildings.

Table and Chairs

- **Table and Chair Location.** Locate tables together with chairs in areas that are oriented to the user needs of socializing, relaxing, or eating in spaces with a pleasant setting and attractive view.
- **Table and Chair Sites.** Table and chair groupings shall be located on hard pavement areas. Pavement material shall match surrounding pavements when applicable. Incorporate tree planting and overhead trellis structures to provide shade and spatial definition.
- **Table and Chair Design.** The selection of a table design for any project is based upon the district in which the project is located.

Picnic Tables

- **Picnic Table Location.** Locate chairs together with tables that are oriented to the user needs of socializing, relaxing, or eating in less formal spaces with a pleasant setting and attractive view.
- **Picnic Table Sites.** Picnic tables in employee break areas adjacent to facilities shall be located on hard pavement areas. Pavement material shall match surrounding pavements. Incorporate tree planting to provide shade. Picnic tables located in recreation open areas or within natural settings may be located on hard pavement or turf, depending on the specific situation.
- **Picnic Table Design.** The selection of a picnic table design for any project is based upon the district in which the project is located.

Shelters

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.

Bus Shelters

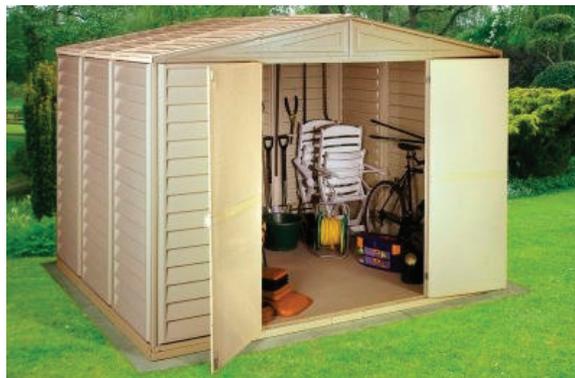
- **Bus Shelter Location.** Bus shelters shall be located at major facilities and employment centers along the bus route. Bus stops shall relate to major pedestrian walkways and be placed on concrete pads. A minimum three foot clearance between shelters and the edge of walks shall be provided.
- **Bus Shelter Design.** Bus shelters shall provide protection from wind, rain, and sun with an overhead roof and enclosure on three sides. Side enclosures shall be a transparent, unbreakable type material to allow for adequate visibility. Bus shelter design typically shall be simple and consistent throughout the Post, matching the existing bus shelters in terms of materials, scale, and detail. They also shall be similar in character to kiosks and vending machine shelters. Bus shelters shall have a minimum size of five feet by eight feet with a minimum height of six feet and six inches from floor to the underside of the roof. The shelters shall include an integral bench, trash receptacle, and ashtray.

Picnic Shelters

- **Picnic Shelter Location.** Picnic shelters shall be strategically located and sized for shared use to discourage the proliferation of small shelters scattered throughout the Installation.
- **Picnic Shelter Design.** Picnic shelters can be open on all sides. The minimum size shall be 12 feet square with a minimum seven feet and six inch vertical clearance.

Smoking Shelters

- **Smoking Shelter Location.** Smoking shelters shall be located at major facilities and employment centers for personnel use. They shall be placed on concrete pads away from major circulation areas, high visibility areas, and main entrances, but maintain access from nearby facilities.
- **Smoking Shelter Design.** Smoking shelters shall provide protection from wind, rain, and sun with an overhead roof with enclosure on three or four sides. Side enclosures shall be a transparent, unbreakable type material to allow for adequate visibility. The design typically shall be simple and consistent throughout the Post, matching the existing shelters and adjacent facilities in terms of materials, scale, and detail. Bus shelters shall have a minimum size of five feet by nine feet with a minimum height of seven feet from floor to underside of roof.



Examples of types of shelters present at Fort Belvoir.

Storage Unit

- **Storage Unit Location.** Storage units shall be located near or adjacent to existing structures, rather than in open spaces. The units must be located on the private (rather than the public) side of the building. They must be positioned in an organized fashion. Exterior storage sheds are not permitted for large institutional buildings or large internal access residential buildings.
- **Storage Unit Design.** Storage units shall provide protection from the elements with an overhead roof with enclosure on four sides. The design shall be simple and consistent throughout the Post and the materials and colors must harmonize with adjacent buildings. The units must be made of weather durable material that is low maintenance. The size of the storage units must be proportionate to the size of the adjacent related buildings: between 5 percent and 10 percent of the main building floor area. A relatively standard size for the unit shall be 10 feet by 10 feet. The units shall have wide double doors and a locking mechanism for security. An example of a storage unit is the Duramax Woodbridge Shed with Foundation (Model #00414) or approved equal.



Screened dumpster at the Fort Belvoir Community Center.



Shadowbox fence screening electrical/mechanical equipment.

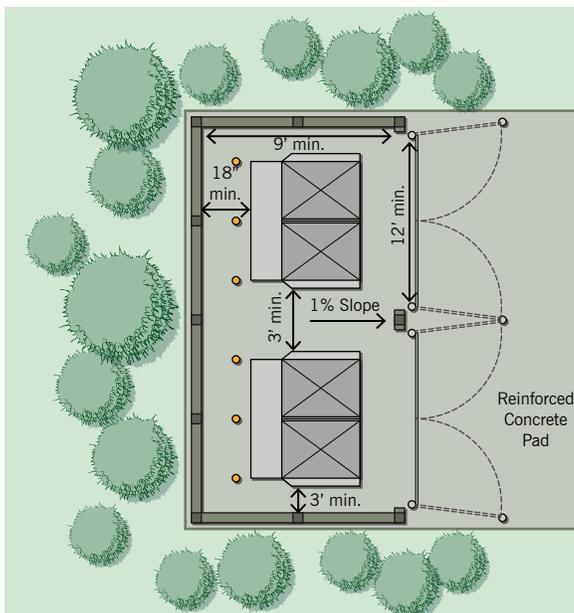
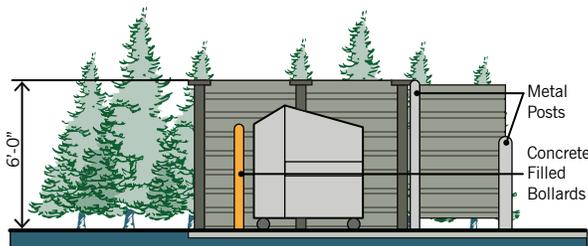


Figure 6.9: Dumpster Site Design

Trash and Recycling Receptacles

- Trash and Recycling Receptacle Location.** Trash containers shall be highly visible and accessible for effective litter control, near major pedestrian intersections, building entrances and seating/eating areas. AT/FP requirements may restrict the location to conventional construction standoff distances for inhabited buildings (see the most current Unified Facilities Criteria for DoD Minimum Anti-terrorism Standards).

- Trash and Recycling Receptacle Design.** Container design shall be compatible and in harmony with other site furnishings. Specific design is based upon which district the receptacle is to be located.

Dumpsters and Electrical/Mechanical Equipment Screening

- Dumpster Location.** To the greatest extent possible, incorporate dumpsters into an enclosure screened with walls, fencing, or plant material. Avoid locating dumpsters along major circulation or public areas. Dumpsters shall be directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. AT/FP requirements restrict the location of dumpsters to conventional construction standoff distances for inhabited buildings (see the most current Unified Facilities Criteria for DoD Minimum Anti-terrorism Standards).

- Dumpster Site Design.** Incorporate plantings to buffer the visual impact of screen walls around dumpsters. Walls or fencing shall be a maximum six feet in height, and can be composed of brick veneer masonry, metal siding, or painted/stained wood to match the adjacent structures. Provide a minimum three foot clearance between screen walls and dumpsters to allow adequate pedestrian and truck access. All dumpsters shall be placed on concrete pads with aprons large enough to encompass the bearing points of the service vehicle. Concrete filled and painted bollards shall be placed at a minimum 18 inches from the rear wall or fence to prevent dumpsters from hitting the enclosure. Evergreen shrubs shall be utilized to screen the enclosure if necessary.

- Electrical/Mechanical Equipment Screening.** Match the existing building materials for enclosures for districts outside the Historic Core, Town Center and Community Support District. Use straight shadowbox fencing around mechanical/electrical equipment located adjacent to facilities within the Historic Core, Town Center, and Community Support Districts. Similar to the dumpster site design, the screening fence/wall shall enclose three sides, have a gate with hasps and a locking mechanism, and be accessible from a distance. If using shadowbox fencing, it shall be red cedar or treated pine that shall remain natural and never painted.

Planters

- **Planter Location.** Movable pre-cast concrete or steel planters may be used outside building entrances to provide seasonal color and interest, and function as security threat barriers. Planters shall be located to block uninterrupted vehicular access to a building, but not excessively impede pedestrian movement. Several planters of various sizes may be grouped together to produce an aesthetically pleasing display.
- **Planter Design.** Selection of planters will be integrated with the surroundings in which they are placed. Planter design is based upon the district in which the site element is to be located.

Bicycle Racks and Storage

- **Bicycle Rack Location.** Bicycle racks shall be provided at key destination locations. They shall be located on a concrete surface where they will not impede pedestrian movement or block building entrances.
- **Bicycle Rack Design.** A ribbon type tubular aluminum bicycle rack with an anodized dark bronze or black finish is the Post standard.
- **Bicycle Storage.** This is an open-sided covered area for longer term storage of bicycles. Use of these elements is limited to high density residential areas and troop barracks.



Bollards

- **Bollards Use.** Bollards are utilized to separate vehicular and pedestrian traffic, direct access, add decorative elements in pedestrian areas, protect buildings and structures, or provide force protection. They shall be spaced to block or direct vehicular circulation, but not excessively impede pedestrian movement.
- **Bollards Design.** The design of bollards can be as varied as the site where they are placed. Bollards are selected for each district. If bollards need specific ratings for force protection, then substitutes shall be reviewed by the DPW; in general, bollards shall match the particular style of site elements.

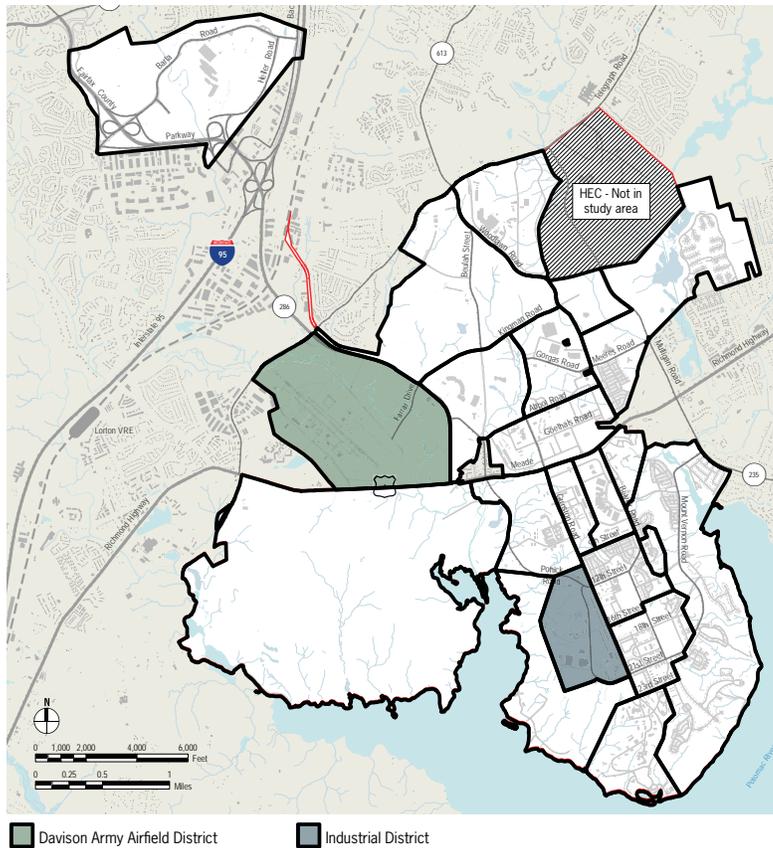
Playgrounds

- **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.
- **Playground Equipment Location and Design.** Play equipment is permitted in non-historic residential areas, recreation and open space areas, and Child Development Centers (CDCs). The design shall accommodate the anticipated population and usage requirements, and follow industry safety standards.
- **Playground Inspection and Maintenance.** A play area inspection and maintenance program for CDCs can be found in Technical Manual (TM) 5-663, Child Development Center, Play Area Inspection and Maintenance Program.



Examples of planters, bicycle racks, bollards and a playground present on Fort Belvoir.

Figure 6.10: Utilitarian Style Districts



Aerial view of DAAF.



DOL warehouse located in the Industrial District.

District Site Furnishings

This section provides guidance on the style and type of site furnishings designated for each district. Site elements appointed for each district match the function and architectural style of facilities present, or the style envisioned to create the ideal state in the long term. The same site furnishings, such as tables and chairs, bicycle racks, shelters, or bollards, may be designated in different site furnishing styles and tables to connect districts visually and create a cohesive and consistent visual appearance across the Post.

Utilitarian Style Site Furnishings

As shown in Figure 6.10, the DAAF and Industrial Districts include utilitarian style site furnishings. These districts denote industrial and heavy-use areas comprised of mission partner and Installation support facilities such as aviation hangars, storage facilities and warehouses, motorpools, and associated office facilities. The visual character, therefore, is based on functional form and practicality, and the site furnishing style shall match to create a unified appearance. Important aspects to consider for utilitarian site furnishings include:

- Simple forms and shapes that reflect the practical nature of the districts.
- Durable materials, such as metal or concrete, to endure locations of intense industrial activity for the long term.
- Black, dark-bronze, or exposed aggregate concrete finishes that blend with the context of the district.
- Site furnishings shall be placed in high activity areas and/or major employment centers to promote pedestrian activity and social interaction.

Table 6.4: Utilitarian Site Furnishings

Informal Bench



Millennium Seating or approved equal

1983 Lower Roswell Rd.
Marietta, GA 30068
Toll free: (866) 379-8422
Tel: (770) 565-1965
www.millenniumseating.com

- Model #: pp-930101;
- Steel mesh/coated black finish

Informal Table and Chairs



Highland Products Group or approved equal

3350 NW Boca Raton Blvd. #B2
Boca Raton, FL 33431
Toll free: (800) 695-3503
Tel: (561) 620-7878
www.theparkcatalog.com

- Model #:145-1159 & 145-1158;
- Steel mesh/coated black finish

Informal Picnic Table



Highland Products Group or approved equal

3350 NW Boca Raton Blvd. #B2
Boca Raton, FL 33431
Toll free: (800) 695-3503
Tel: (561) 620-7878
www.theparkcatalog.com

- Model #: 166-1016;
- Steel mesh/coated black finish

Picnic Pavilion



Gazebo Creations or approved equal

5410 Route 8
Gibsonia, PA 15044
Toll free: (888) 293-2339
www.gazebrocreations.com

- Model #: Summerset Pavilions
- Wood pavilion with a single steel roof/grey or dark bronze

Smoking Shelter/Small Shelter



Handi-hut, Inc. or approved equal

3 Grunwald Street
Clifton, NJ 07013
Toll free: (800) 603-6635
www.handi-hut.com

- Model #: S4-2PH Vented Air-Flow Poly-Hip Roof
- Aluminum frame w/ tempered glass and dark bronze finish

Bus Shelter



Handi-hut, Inc. or approved equal

3 Grunwald Street
Clifton, NJ 07013
Toll free: (800) 603-6635
www.handi-hut.com

- Model #: 4-1R
- Aluminum frame w/ tempered glass and dark bronze finish
- Black standing seam roof

Informal Trash Receptacle



Global Industrial or approved equal

2505 Mill Center Parkway, Suite 100
Buford, GA 30518-3700
Toll free: (800) 806-5984
www.globalindustrial.com

- Model #:WBB462326;
- Diamond pattern/coated black

Ash Urn



Witt Industries or approved equal

4600 N. Mason-Montgomery Rd.
Mason, OH
Toll free: (800) 543.7417
www.witt.com

- Model #: MSK-BLK
- Black galvanized steel

Formal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRCS-103;
- Tubular steel pipe/black finish

Informal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRQS-101;
- Tubular steel pipe/black finish

Informal Planter



Millennium Seating or approved equal

1983 Lower Roswell Rd.
Marietta, GA 30068
Toll free: (866) 379-8422
Tel: (770) 565-1965
www.millenniumseating.com

- Model #: pp-9pl202 w/liner;
- Steel mesh/coated black finish

Informal Bollard

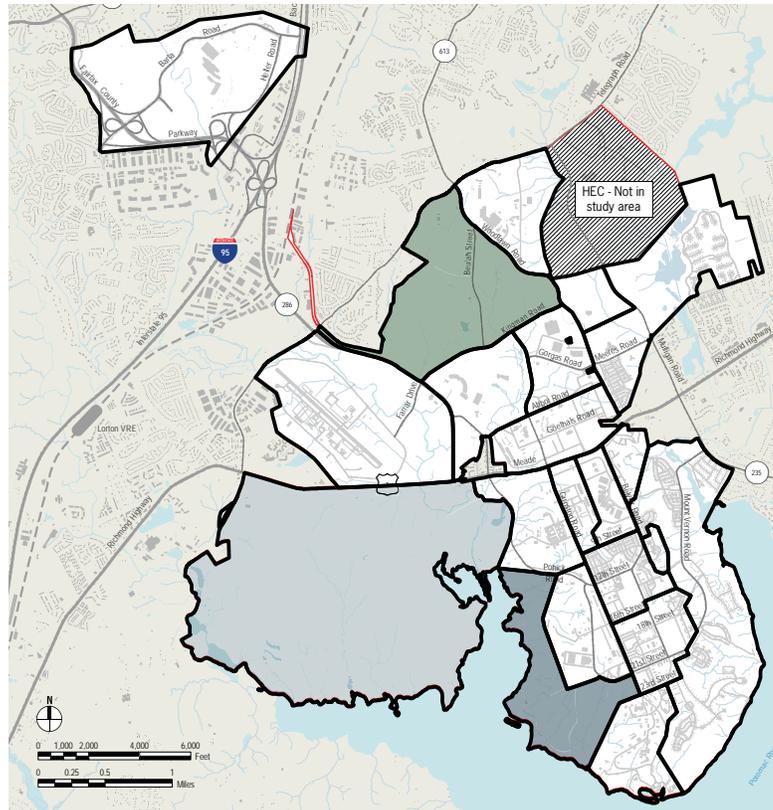


Fair Weather Site Furnishings & Accessories or approved equal

1540 Leader International Drive
Port Orchard, WA 98367
Toll free: (800) 323-1798
www.fairweathersf.com.com

- Model #: B-2;
- Black powder coated finish

Figure 6.11: Recreation Style Districts



Regional District
 Recreation District
 Southwest District

Recreation Style Site Furnishings

Recreation style site furnishings can be found in the Regional District at the Fort Belvoir Golf Course, the Recreational District, and the Southwest District (Figure 6.11). These districts represent outdoor recreation areas, training, and conservation/wildlife refuges; therefore, the visual character is scenic and natural. Site furnishings shall blend with the picturesque setting and enhance the architecture, environment, and user’s experience. Important guidelines to follow include:

- Simple modern design that does not compete with the natural setting of the districts.
- Practical design that is durable to withstand intense public use for the long term.
- Durable materials, such as metal or pre-cast concrete shall be used in active recreational areas or high activity areas. Passive recreation areas can use treated wood or composite wood for added durability.
- Dark finishes, such as black, dark-bronze, or hunter green, or natural finishes shall be used to blend with the natural setting.
- Site furnishings shall be placed along pedestrian pathways, adjacent to recreational facilities, or high public use areas. Their locations shall blend with the natural topography and environment of the districts.



Fort Belvoir Golf Course.



Tompkins Basin recreational pier.

Table 6.5: Recreational Site Furnishings

Recreational Bench



Bluegrass Playgrounds, Inc. or approved equal

1058 Fedde Lane
Ashland, NE 68003
Toll free: (800) 828-9690
www.bluegrassplaygrounds.com

- Model #:B8WBWIRES;
- Welded wire/green w/black base

Recreational Table and Chairs



Belson Outdoors or approved equal

111 North River Rd.
North Aurora, IL 60542
Toll free: (800) 323-5664
Tel: (630) 897-8489
www.belson.com

- Model #:CH42R-P & H_CHAIR;
- Green punched steel/coated green w/ black base finish

Recreational Picnic Table



Bluegrass Playgrounds, Inc. or approved equal

1058 Fedde Lane
Ashland, NE 68003
Toll free: (800) 828-9690
www.bluegrassplaygrounds.com

- Model #:T6WIRE;
- Welded wire/green w/black base

Picnic Pavilion



Gazebo Creations or approved equal

5410 Route 8
Gibsonia, PA 15044
Toll free: (888) 293-2339
www.gazebrocreations.com

- Model #: COG0600 (6') - COG3000 (30')
- Wood gazebo w/cupola

Smoking Shelter/Small Shelter



Leonard LLC or approved equal

8136 Sudley Rd.
Manassas, VA 20109
Toll free: (866) 453-4409
www.leonardusa.com

- Model #:Mayberry
- Wood gazebo w/ shingles and benches

Bus Shelter



Custom bus stop or approved equal

- Brick and stone; match color of materials to surrounding architecture.
- Running bond or flemish bond are permissible.
- Roofing material may be shingles to match clubhouse.
- Windows on all three sides of enclosure.

Recreational Trash Receptacle



Safco or approved equal

Aoife Company, LLC
1136-1146 Stratford Ave.
Stratford, CT 06615
Toll free: (800) 667-8721
www.kitchensource.com

- Model #:9472NC/TN;
- Canmeleon aggregate panel, side open, black finish

Ash Urn



Belson Outdoors or approved equal

111 North River Rd.
North Aurora, IL 60542
Toll free: (800) 323-5664
Tel: (630) 897-8489
www.belson.com

- Model #: PCSPYA;
- Steel/coated black finish

Formal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRCS-103;
- Tubular steel pipe/black finish

Informal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRQS-101;
- River rock aggregate color

Recreational Planter



Highland Products Group or approved equal

3350 NW Boca Raton Blvd. #B2
Boca Raton, FL 33431
Toll free: (800) 695-3503
Tel: (561) 620-7878
www.theparkcatalog.com

- Model #: 154 - 1115 Series;
- Portland cement/sand tan finish

Recreational Bollard

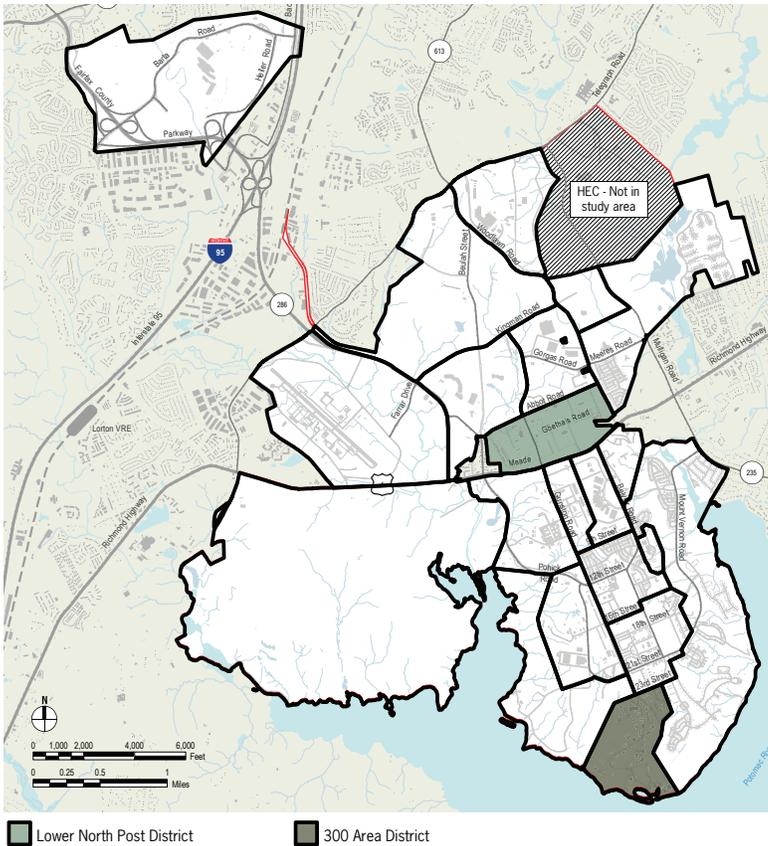


Belson Outdoors or approved equal

111 North River Rd.
North Aurora, IL 60542
Toll free: (800) 323-5664
Tel: (630) 897-8489
www.belson.com

- Model #: TF6031;
- Precast concrete w/buff color finish

Figure 6.12: Transitional Style Districts



Transitional Style District

Transitional style denotes the merging of one style with another to form a more modern version. The transitional style site furnishings combine the utilitarian style with the contemporary style to match the architecture of the Lower North Post District and the 300 Area District. These districts encompass several functions including office, research and development, and troop operations; therefore, a site furnishing palette is required that can blend with the various functions and settings, and unify the two districts. As new development occurs, this palette of site furnishings shall be implemented to create visual continuity. Important aspects to consider for transitional site furnishings include:

- Simple forms and shapes that blend with the various functions and settings within the districts.
- Durable materials, such as metal, to endure locations of intense public and operational activities for the long term.
- Black or dark-bronze finishes that blend with the context of the district.
- Site furnishings shall be placed in high activity areas and/or major employment centers to promote pedestrian activity and social interaction.



Site furnishings adjacent to OCAR.



Benches and trash receptacles at the OCAR facility.

Table 6.6: Transitional Style Site Furnishings

Informal Bench



Millennium Seating or approved equal

1983 Lower Roswell Rd.
Marietta, GA 30068
Toll free: (866) 379-8422
Tel: (770) 565-1965
www.millenniumseating.com

- Model #: pp-936101;
- Steel mesh/coated black finish

Informal Table and Chairs



Millennium Seating or approved equal

1983 Lower Roswell Rd.
Marietta, GA 30068
Toll free: (866) 379-8422
Tel: (770) 565-1965
www.millenniumseating.com

- Model #: pp-939d31 & pp-908d81;
- Steel mesh/coated black finish

Informal Picnic Table



Highland Products Group or approved equal

3350 NW Boca Raton Blvd. #B2
Boca Raton, FL 33431
Toll free: (800) 695-3503
Tel: (561) 620-7878
www.theparkcatalog.com

- Model #: 347-1022;
- Steel mesh/coated black finish

Picnic Pavilion



Gazebo Creations or approved equal

5410 Route 8
Gibsonia, PA 15044
Toll free: (888) 293-2339
www.gazebrocreations.com

- Model #: LWG1212-03 Savannah
- Wood pavilion with a single roof

Smoking Shelter/Small Shelter



Handi-hut, Inc. or approved equal

3 Grunwald Street
Clifton, NJ 07013
Toll free: (800) 603-6635
www.handi-hut.com

- Model #: S4-2PH Vented Air-Flow Poly-Hip Roof
- Aluminum frame w/ tempered glass and dark bronze finish

Bus Shelter



Handi-hut, Inc. or approved equal

3 Grunwald Street
Clifton, NJ 07013
Toll free: (800) 603-6635
www.handi-hut.com

- Model #: 4-1R
- Aluminum frame w/ tempered glass and dark bronze finish
- Black standing seam roof

Informal Trash Receptacle



Global Industrial or approved equal

2505 Mill Center Parkway, Suite 100
Buford, GA 30518-3700
Toll free: (800) 806-5984
www.globalindustrial.com

- Model #: WGB236957 w/rain lid;
- Diamond pattern/coated black

Ash Urn



Global Industrial or approved equal

2505 Mill Center Parkway, Suite 100
Buford, GA 30518-3700
Toll free: (800) 806-5984
www.globalindustrial.com

- Model #: WB261108BK
- Polyethylene plastic/black finish

Formal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRCS-103;
- Tubular steel pipe/black finish

Informal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRQS-101;
- Tubular steel pipe/black finish

Informal Planter



Millennium Seating or approved equal

1983 Lower Roswell Rd.
Marietta, GA 30068
Toll free: (866) 379-8422
Tel: (770) 565-1965
www.millenniumseating.com

- Model #: pp-9pl102 w/liner;
- Steel mesh/coated black finish

Informal Bollard

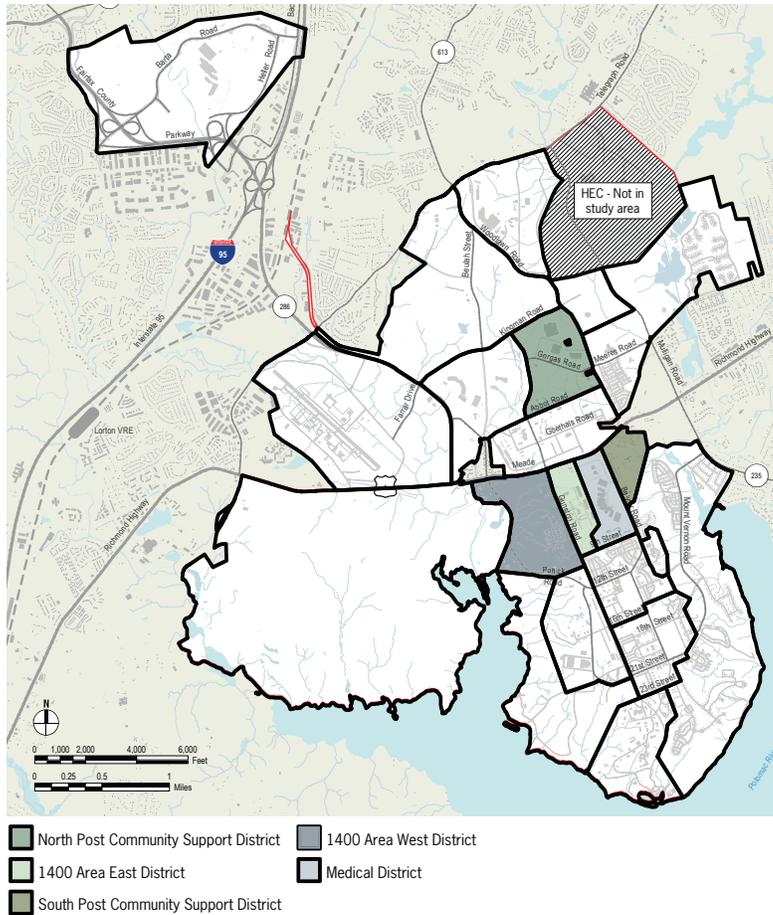


Belson Outdoors or approved equal

111 North River Rd.
North Aurora, IL 60542
Toll free: (800) 323-5664
Tel: (630) 897-8489
www.belson.com

- Model #: BOL450-IG-P;
- Steel/coated black finish

Figure 6.13: Contemporary Style Districts



Contemporary Style Site Furnishings

Figure 6.13 shows the five districts that presently have or plan to include contemporary style site furnishings in the future. These districts have been either redeveloped recently or will be redeveloped in the future to reflect a contemporary interpretation of the traditional style of architecture prevalent in the historic district. The districts include a mix of uses such as retail, office, residential, and civic/community facilities; therefore, a more modern universal palette of site furnishings is needed to unify the districts, connect them visually to each other, and blend with the contemporary architecture present. Table 6.7 shows the palette. The Warrior Transition campus in the Medical District and new facilities within the South Post Community Support District have already integrated the palette into their sites. Important aspects of the palette include:

- Contemporary interpretation of traditional style designs that blend with many settings and functions.
- Simple design, minimal ornamentation and clean lines that will endure for the long term.
- Durable materials such as metal shall be used to withstand intense public use.
- Dark finishes, such as black or dark-bronze, that blend with the traditional style.
- Location of site furnishings shall be adjacent to public facilities, pedestrian pathways, employment centers, or high activity areas. These shall be clustered to promote social interaction and enhance the user's environment.



Benches and planters at the Warrior Transition Campus.



Pavilion at the Warrior Transition Campus.

Table 6.7: Contemporary Site Furnishings

Formal Bench



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: NRB-6;
- Steel frame/black finish

Formal Table and Chairs



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: PRSCT-36 & PRSCC-8;
- Steel frame/black finish

Formal Picnic Table



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: FRST-6;
- Steel frame/black finish

Picnic Pavilion



Gazebo Creations or approved equal

5410 Route 8
Gibsonia, PA 15044
Toll free: (888) 293-2339
www.gazebrocreations.com

- Model #: Summerset all steel pavilion with custom brick pillars/grey roof.

Smoking Shelter/Small Shelter



Handi-hut, Inc. or approved equal

3 Grunwald Street
Clifton, NJ 07013
Toll free: (800) 603-6635
www.handi-hut.com

- Model #S4-2PH Vented Air-Flow Poly-Hip Roof
- Aluminum frame w/ tempered glass and dark bronze finish

Bus Shelter



Custom bus stop or approved equal

- Brick and stone; match color of materials to surrounding architecture.
- Running bond or flemish bond are permissible.
- Roofing material may be corrugated metal roofing.
- Windows on all three sides of enclosure.

Formal Trash Receptacle



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: T-24 w/dome lid;
- Steel frame/black finish

Ash Urn



Witt Industries or approved equal

4600 N. Mason-Montgomery Rd.
Mason, OH
Toll free: (800) 543.7417
www.witt.com

- Model #: MSK-BLK
- Black galvanized steel

Formal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRCS-103;
- Tubular steel pipe/black finish

Informal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRQS-101;
- River rock aggregate color

Formal Planter



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: TP-36;
- Steel Frame/black finish w/liner.

Formal Bollard

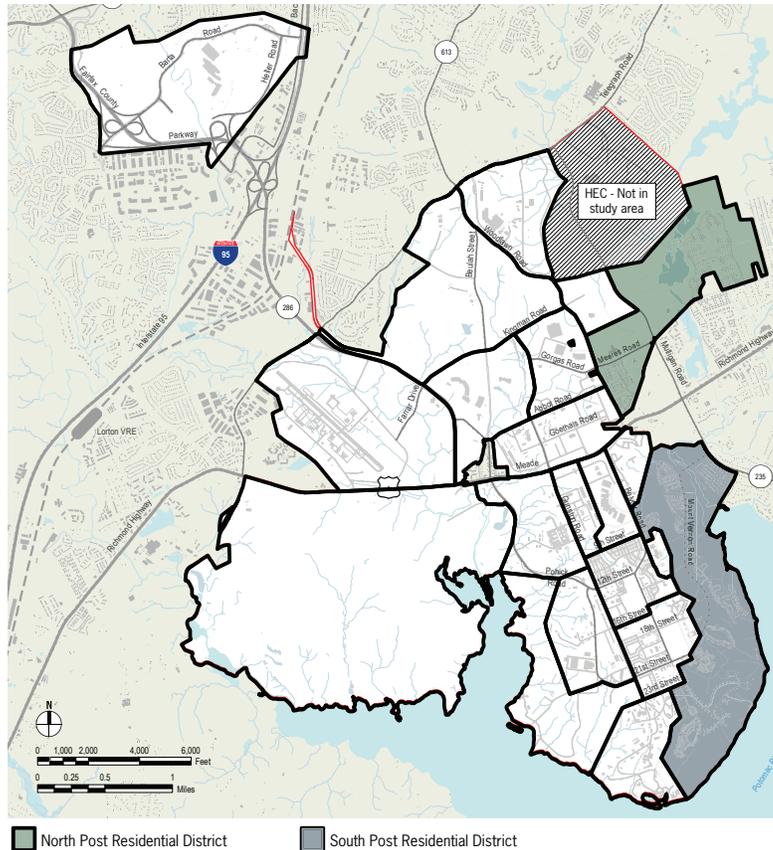


Custom Park & Leisure Ltd.

4111 - 17th Street SE
Calgary, Alberta, Canada
Toll free: (866) 569-8104
Tel: (403) 569-8180
www.custompark.com

- Model #: Series C-2;
- Black coated steel tubing

Figure 6.14: Residential Style Districts



Residential Style Site Furnishings

Due to their close proximity to each other, the residential districts share many common visual characteristics with the contemporary style redeveloped districts and the historic district of South Post. This creates the need for a unified palette of site furnishings that blends with traditional and contemporary architecture since the boundaries that separate the districts are not always apparent. Table 6.8 depicts the residential style site furnishings that complement the Colonial Revival style of the villages on Fort Belvoir. It includes both traditional and contemporary site furnishings that blend with the Traditional Neighborhood Design concept and enhance the residents' environment. Guidelines for the palette include:

- Mix of contemporary and traditional style designs that complement the architectural style and support the Traditional Neighborhood Design concept.
- Simple design, minimal ornamentation to create interest, and clean lines that will endure for the long term.
- Durable materials such as metal or recycled wood shall be used to withstand intense public use.
- Dark finishes, such as black or dark-bronze, that blend with the traditional style.
- Location of site furnishings shall be in common areas, high activity areas, or along pedestrian pathways for resident use.



Site furnishings at Fairfax Village.



Picnic pavilion at Cedar Grove Village.

Table 6.8: Residential Site Furnishings

Formal Bench



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #:C-10, Classic Series;
- Black steel frame/wood slats

Formal Table and Chairs



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #:PR SCT-36 & PRSCC-8;
- Steel frame/black finish

Formal Picnic Table



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #:C-9 & C-7;
- Black steel frame/wood slats

Picnic Pavilion



Custom pavilion or approved equal

- Brick pillars with white decorative columns
- Gabled roof with metal standing seam roof
- White trim, fascia, gutters

Smoking Shelter/Small Shelter



Gazebo Creations or approved equal

5410 Route 8
Gibsonia, PA 15044
Toll free: (888) 293-2339
www.gazebrocreations.com

- Model #: COG0600 (6')
- Wood gazebo w/cupola

Bus Shelter



Custom bus stop or approved equal

- Brick and stone; match color of materials to surrounding architecture.
- Running bond or flemish bond are permissible.
- Roofing material may be corrugated metal roofing or shingles.
- Windows on all three sides of enclosure.

Formal Trash Receptacle



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #:NSDC-36 w/convex lid;
- Steel frame/black finish

Ash Urn



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #:NSDC-20 w/convex lid;
- Steel frame/black finish

Formal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRCS-103;
- Tubular steel pipe/black finish

Informal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRQS-101;
- River rock aggregate color

Formal Planter



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: TP-36;
- Steel Frame/black finish w/liner.

Formal Bollard

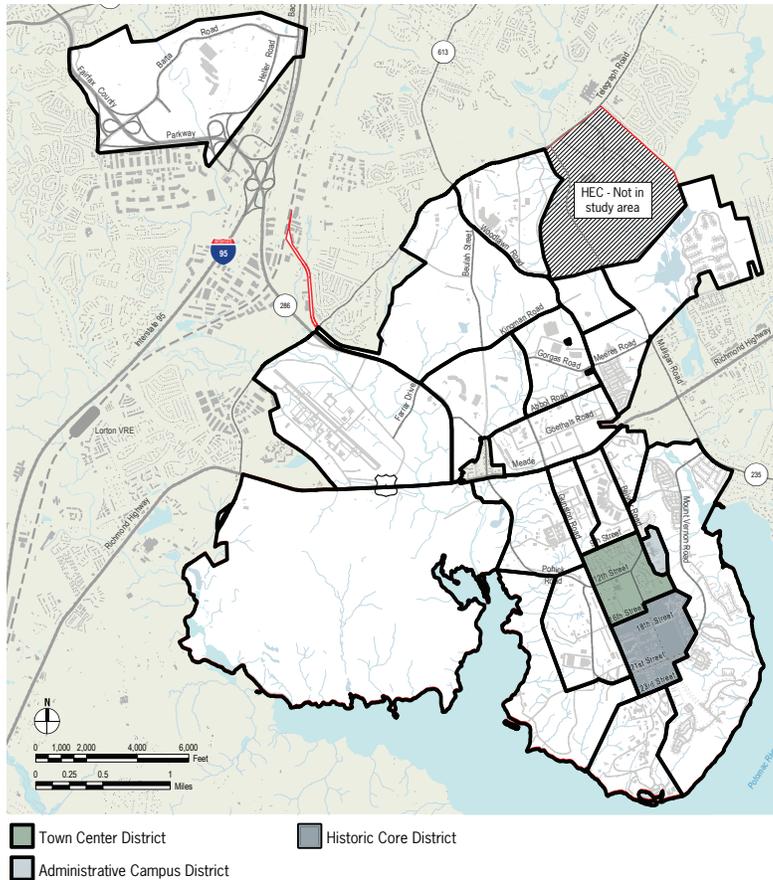


Reliance Foundry Co. Ltd. or approved equal

6450 148 Street #207
Surrey, BC V3S 7G7
Toll free: (888) 735-5680
Tel: (604) 592-4333
www.bollards.ca

- Model #:R-7331;
- Iron decorative bollard/black

Figure 6.15: Classical Style Districts



Historic Style Site Furnishings

The Historic style site furnishings are distinguished by the Colonial Revival architecture of the Historic Core District and adjacent Town Center. The formal organization of the districts and site design require a complementary palette of site furnishings that responds to the ceremonial setting. The Historic style palette of site furnishings shall reflect a formality that blends with the existing traditional style furnishings and emphasizes the districts' importance as well as enhances their beauty. Important aspects for site furnishings include:

- Historic style designs with minimal ornamentation to create interest.
- Contemporary interpretations of Colonial Revival style furnishings.
- Durable materials such as metal or recycled wood shall be used to withstand intense public use.
- Dark finishes, such as black, dark-bronze or copper, that blend with the historic district.
- Location of site furnishings shall be adjacent to public facilities, pedestrian pathways, employment centers, or high activity areas. These shall be clustered to promote social interaction and enhance the users environment.



Site furnishings at the Town Center.



Site furnishings at the Missile Defense Agency.

Table 6.9: Classical Site Furnishings

Formal Bench



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: C-10;
- Iron frame ends/wood slats

Formal Table and Chairs



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: PRSCT-36 & PRSCC-8;
- Steel frame/black finish

Formal Picnic Table



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: C-9;
- Cast iron frame/wood slats

Picnic Pavilion



Gazebo Creations or approved equal

5410 Route 8
Gibsonia, PA 15044
Toll free: (888) 293-2339
www.gazebrocreations.com

- Model #: COG0600 (6') - COG3000 (30)'
- Wood gazebo w/cupola

Smoking Shelter/Small Shelter



Leonard LLC or approved equal

8136 Sudley Rd.
Manassas, VA 20109
Toll free: (866) 453-4409
www.leonardusa.com

- Model #: Mayberry
- Wood gazebo w/ shingles and benches

Bus Shelter



Custom bus stop or approved equal

- Brick and stone; match color of materials to surrounding architecture.
- Running bond or flemish bond are permissible.
- Roofing material is shingles to match adjacent buildings.
- Windows on all three sides of enclosure.

Formal Trash Receptacle



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: FC-12 w/ convex lid;
- Steel frame/black finish

Ash Urn



Victor Stanley, Inc. or approved equal

P.O. Drawer 330
Dunkirk, MD 20754
Toll free: (800) 368-2573
Tel: (301) 855-8300
www.victorstanley.com

- Model #: FC-6;
- Steel frame/black finish

Formal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRCS-103;
- Tubular steel pipe/black finish

Informal Bicycle Rack



Secure Site Design, LLC or approved equal

P.O. Box 307
Dunkirk, MD 20754
Toll free: (800) 268-4726
Tel: (410) 286-3375
www.securesitedesign.com

- Model #: BRQS-101;
- Tubular steel pipe/black finish

Formal Planter



Fair Weather Site Furnishings & Accessories or approved equal

1540 Leader International Drive
Port Orchard, WA 98367
Toll free: (800) 323-1798
www.fairweathersf.com.com

- Model #: PTR-3.2;
- Steel straps/decorative rings/black finish.

Formal Bollard

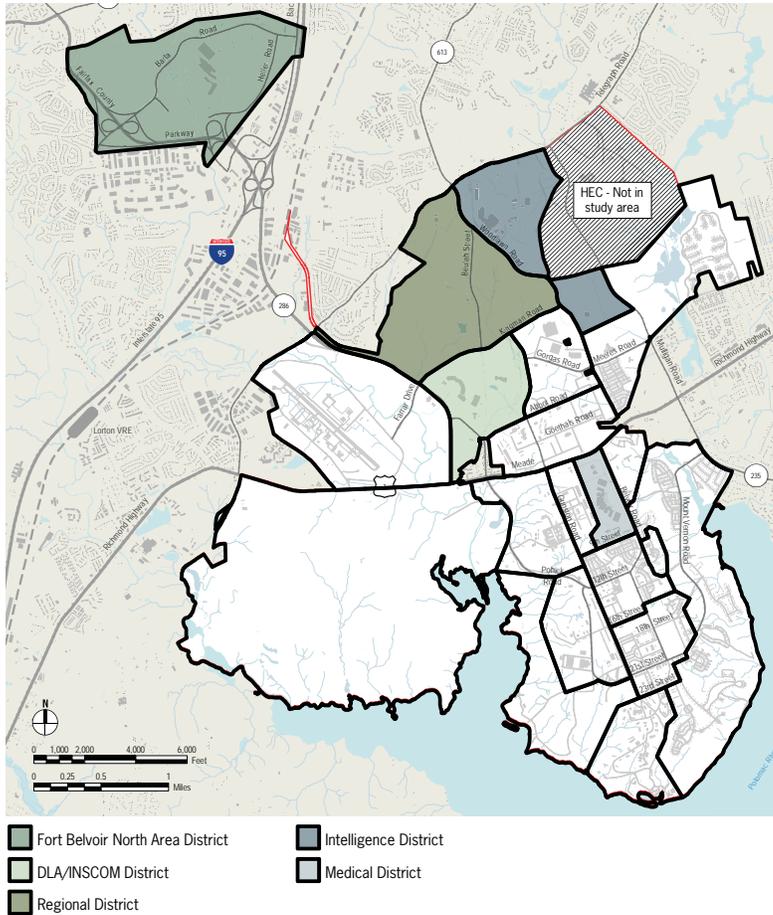


Reliance Foundry Co. Ltd. or approved equal

6450 148 Street #207
Surrey, BC V3S 7G7
Toll free: (888) 735-5680
Tel: (604) 592-4333
www.bollards.ca

- Model #: R-7331;
- Iron decorative bollard/black

Figure 6.16: Iconic Style Districts



Iconic Style Site Furnishings

The iconic style site furnishings are located within individual campuses and districts on Fort Belvoir. These districts encompass mission partner facilities that are highly distinctive in their design character, and at this time, it is not practical to enforce site furnishing standards or a palette on these locations. Future development shall match the existing site furnishing and type, and architectural character of these districts to blend with the context of the site. If the same site furnishing initially used is not available at the project design or installation time frame, a site furnishing closely resembling the component may be substituted. The photos below show the different iconic districts and the type of site furnishings that shall be matched.

Future development associated with the FBCH or expansion of the hospital facilities in the Medical District shall match the existing iconic site furnishings. If the development within the Medical District is not associated with the hospital, the contemporary style site furnishing palette shall be used.

Similarly, future development associated with the National Museum of the U.S. Army or expansion of the museum facilities in the Regional District shall match the iconic site furnishings. If development within the Regional District is not associated with the museum, the recreation style site furnishing palette shall be used..



Benches at FBCH.



Iconic style site furnishings at the DLA.



Proposed site furnishings for the new INSCOM complex



FBCH healing garden tables and chairs.



Iconic style site furnishings at the NGA plaza.



Iconic style site furnishings at the NGA.

Monuments

Monuments serve to highlight the mission and accomplishments of the nation's armed forces or special accomplishments associated with Fort Belvoir. They are a highly varied ensemble of site elements that may include but are not limited to:

- Flagpoles
- Sculpture
- Memorials
- Static displays

Although the design and execution of each memorial cannot be specified, consideration for placement and hierarchy is as follows:

Major monuments are those intended to represent the entire Installation or the nation.

- Placement should be in highly visible and publicly prominent locations.
- Scale and design should relate to the space it will occupy.
- Placement should relate to the surrounding buildings, roads, and other physical features in a logical and ordered manner.

Minor monuments are those that relate to individuals or tenants specific to the installation.

- Scale should be in proportion to the building and space it occupies, as well as the overall hierarchy of monuments on Post.
- Static displays of multiple elements should be consolidated in one location (such as a museum or exhibition area).

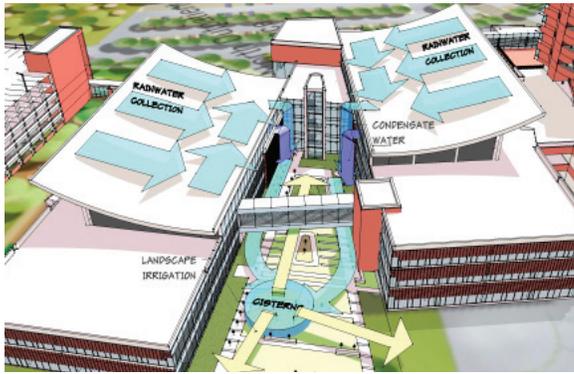
Flagpoles / Banners: visual landmarks that demarcate areas of special significance or importance.

- Flagpoles are to be selectively located at the major facilities and significant gathering areas.
- Flagpoles should include lighting and may be accented with planting beds.
- Banners can highlight prominent areas of vehicular and foot traffic.
- Banners will be decorative and/or informative flags mounted to light posts, building facades, or other vertical elements.

Ultimately, the final design and placement of the monument must be part of a design review process that encourages participation with the Garrison and the monument's sponsor.



Monuments can comprise of many elements that can be incorporated into sites. Their hierarchy and level of importance will dictate materials and placement.



The FBCH stormwater system collects rainwater and stores it for reuse as irrigation water.



Solar panels on the Fairfax Village Neighborhood Center provide renewable energy to offset energy costs.



The historic style bench uses reclaimed wood or reinforced recycled plastic slats that are durable and environmentally friendly.

Sustainable Design Standards

The following sustainable design standards provide guidance on low impact development techniques and best management practices that can be integrated into a project to create a sustainable site that benefits both the users and the environment. These include:

- Capturing and re-using stormwater/grey water for irrigation processes on the project site.
- Designing for stormwater storage under parking lots with site design for new projects.
- Incorporating rain gardens and/or green roofs into the design of the project where appropriate to capture and/or treat stormwater on site.
- Incorporating bioswales and/or vegetated filters on project sites to filter stormwater.
- Using a computer model to create a lighting plan for parking and roadways. The computer model can show where light will leave the project site or if light will reflect on a surface and then leave the site causing light pollution.
- Using full cutoff-shielded, and partially shielded fixtures to direct light down and prevent it from escaping the project site.
- Installing timers, dimmers, sensors, or photocell controllers that turn the lights off during daylight hours or hours when lighting is not needed, to reduce overall energy consumption and eliminate unneeded lighting.
- Integrating renewable energy technologies on site where appropriate to offset facility energy costs. These may include solar panels or micro-wind turbines on facilities.
- Installing salvaged, refurbished, and reused materials on site to reduce the demand for virgin materials. This may include brick for walkways or courtyards, or wood for site elements.
- Installing site furnishings that are preferably made from recyclable materials or renewable materials, composed of environmentally friendly materials, and have a long life cycle analysis.
- Using regional/local manufacturers for site furnishings to reduce transportation costs and energy consumption.

IPS Implementation Checklists

Fort Belvoir General Standard Operating Procedure (SOP) for Construction Project Development and Execution

Planning, Design Review and Execution requirements on Fort Belvoir vary based on project scope and size. Routine operations and maintenance (O&M) actions receive the lowest level of review. Activities that require excavation or exterior actions require a DPW approved Excavation Permit. New facility construction, additions, and renovations receive a higher degree of review. Scope and funding source will determine the exact procedures, but a general summary of typical project steps is listed below.

Early Planning and Programming (Government executed)

- Each project requires a valid funding document. MCA projects, which include most new facilities, or those above installation funding authority require a DA Form 1391. Smaller projects (additions and renovations) require a Work Request DA Form 4283, approved by the DPW, prior to initiating any design. Routine O&M actions such as equipment replacement and service also require an approved DA Form 4283. Privatized utility actions are managed through the Utilities Privatization contract.
- All new facility projects need to address compliance with the existing Master Plan including the IPS. Site selection for new projects is generally performed by the DPW through the National Environmental Policy Act (NEPA) process, approved by the Garrison Commander and ultimately approved by IMCOM. Deviations from the plan will require official authorization from the Master Planner.
- Projects must comply with the NEPA requirements through documentation which may consist of a Record of Environmental Consideration (REC), Environmental Assessment (EA), or Environmental Impact Statement (EIS). Timelines for proper execution of these requirements must be accounted for in the project timeline. Coastal Zone Management Act consistency analysis is necessary at Fort Belvoir and is addressed in the NEPA documentation. Smaller projects can usually comply with NEPA through a REC or a Categorical Exclusion (Catex).



- Projects must address impacts to wetlands, Resource Protection Areas (RPAs), and other environmentally-sensitive areas, and work to avoid such areas or fund mitigation costs for impacts to these areas. If the project site is near wetlands or RPAs, a Jurisdictional Determination must be performed during the NEPA process to clearly delineate the extent of wetlands and quantify any impacts. Based on this survey, mitigation requirements can be determined and a strategy developed.
- Other natural resource surveys may need to be performed during the NEPA process based on the project site location. Small Whorled Pogonia, Wood Turtle, and Bald Eagles are all present on Fort Belvoir and may require site surveys to determine possible impacts.
- All building sites must be evaluated for cultural and historical impacts (Section 106), presence of Unexploded Ordnance (UXO), hazardous materials, asbestos, lead paint and other contaminants. These issues are generally addressed by the DPW staff during initial planning phase and documented during the NEPA process.
- Outside agency reviews must be identified and their timelines and approval processes accounted for in the construction timeline. These agencies include, but are not limited to, NCPC, SHPO, DCR, and the Virginia Department of Environmental Quality (DEQ). These reviews are generally performed during the NEPA process although the NCPC submission must include a final NEPA document. The NCPC process is detailed in the Design Phase.
- Because Fort Belvoir is located within the NCR, new construction projects or major exterior modifications must be submitted to the NCPC for review and approval. Submission requirements and review timelines vary by project type and scope. NCPC submission timelines must be factored into the project schedule to ensure that delays are not incurred waiting for project approval. Specific procedures and submission requirements are found at www.ncpc.gov. Project submissions must have a completed NEPA document, a completed SHPO approval document, and design advanced enough to address key requirements such as stormwater management, architectural conformance with the IPS, and sustainable design features.
- Projects to repair or renovate existing buildings may impact equipment included in an Energy Savings Performance Contract (ESPC) or Utility Energy Service Contract (UESC). These are contract mechanisms that allow private entities to own and operate certain mechanical or electrical systems on Fort Belvoir and result in energy savings for the Post. The DPW Energy Manager must review the scope of the project to determine impacts to equipment and if termination costs must be paid to the equipment owner. These costs may have a significant impact on the project budget and timeline if not identified early in the process.
- Major utilities at Fort Belvoir (electric, water, sewer, gas, telecom) have been privatized, and specific coordination procedures exist for each utility owner to obtain service. Projects that require new connections or modifications to the utility infrastructure require coordination with the DPW and utility owners. Electrical distribution is owned/operated by Dominion Virginia Power. Water and sanitary sewer service is owned/operated by American Water. Natural gas service is provided by Washington Gas. Cable television service is available through Comcast.

Telecom services (phone, internet, Voice over IP/VOIP) are managed by the Network Enterprise Center (NEC), a Department of Army unit.

Design Phase

- A project's scope and Request for Proposal (RFP) will define applicable regulations, design criteria, and codes under which the work is to be completed, to include standard guide specifications and applicable building regulations. These include, but are not limited to, building codes (International Building Code (IBC), National Fire Protection Association (NFPA)), Military Standards (UFCs, TMs, Engineering Technology Building (ETBs)), Army Policies, and state or local regulations (i.e., Virginia Erosion and Sediment Control regulations, Fairfax County Public Facilities Manual). Refer to Appendix C of this IPS for a comprehensive list.
- Projects impacting over 2,500 square feet must comply with the Fort Belvoir Municipal Separate Storm Sewer System (MS4) permit and provide for Stormwater Management (SWM) and Erosion and Sediment (E&S) controls as part of the design. For these projects, a Land Disturbance Letter (LDL) is required prior to beginning construction. Steps for obtaining this are included in this appendix.
- Clean Air Act implications must be addressed. Projects that have the potential to emit air pollution above certain threshold levels require pre-construction permits. These permits require up to six months to obtain after equipment is specified. Very large projects may be subject to more stringent requirements, and permitting may require 18-24 months. Because of the permitting lead times, air emission sources need to be specified early enough to allow for required permitting before any construction may begin.

Design Submission and Review Procedures

- Design effort will vary according to the scope of the particular project. Below are generic guidelines for major new construction projects. Small repair or renovation projects will require reduced level of design effort and review which should be determined at the beginning of the project.

Project charettes are frequently used during the initial programming and design stages of projects to bring together all participants and collaborate on project scope, responsibilities, and requirements. Fort Belvoir encourages this activity as it ensures important issues are addressed early and communication lines are established that are critical to project success.

- Principal reviewing directorates on Fort Belvoir include, but are not limited to, the following:
 - Directorate of Public Works (DPW)
 - Engineering Division
 - Environmental and Natural Resources Division (ENRD)
 - Facility Planning Division
 - Operation and Maintenance Division (O&M)
 - Directorate of Emergency Services (DES)
 - Fire Department
 - Physical Security
 - Directorate of Family, Morale, Welfare and Recreation (DFMWR)
 - Directorate of Plans, Training, Mobilization and Security (DPTMS)
 - Anti-Terrorism / Force Protection
 - Installation Safety Office (ISO)
 - Privatized Utilities
 - American Water (Water/Sewer)
 - Dominion Virginia Power (Electric)
 - Washington Gas (Natural Gas)
 - Fort Belvoir Network Enterprise Center (NEC)
- Design agencies will send design submittals to the proper POCs at each directorate. POCs should be identified during the programming document development (1391) or the kickoff meetings/charettes for each project along with their submittal and review requirements.

- At a minimum for each project, three complete sets of the design submittal will be sent to the DPW Facility Planning Division, with at least one set of the drawings printed half-size. The design agency will also make the submittal available in an electronic format. New facility projects or exterior additions will include one CADD disk, properly geo-referenced. The CADD disk will ultimately go to the DPW Geographic Information System (GIS) office, where the civil data will be incorporated into the GIS data layers, and the disk retained there for record.
- Design review time will typically be set by the design submitter, but will never be less than two weeks unless all parties agree to an expedited timeframe.
- The IPS is the document of record for exterior design requirements. Checklists in the IPS will be used by the Design Team to ensure projects comply with IPS requirements, for review by the Facility Planning division.
- Review comments may be submitted in several different formats. USACE uses "DrChecks" (Design Review and Checking System), an electronic system that allows for maximum accountability and flexibility for processing comments. Facility Planning can assist reviewers in gaining access to this system. Some organizations have their own standard formats. Those must be submitted to Facility Planning to ensure they are available to all Post reviewers. Otherwise, submitting review comments can be done by electronic mail.
- After the review period has expired and all comments have been submitted, a design review or comment resolution meeting should be held. Prior to the comment resolution meeting, the designer will present his initial responses to all comments received. At the resolution meeting, the commenter will have the opportunity to concur with the response or explain his position. Disputes will be resolved at the meeting or tabled for further research and discussion.
- The following are recommended stages of design submittals for a conventional Design Bid Build project*:
 - 10% Pre-concept / Parametric
 - 30% Concept
 - 60% Preliminary
 - 90% Final
 - 95% Back check
 - 100% Solicitation

**Design Build projects and other "fast track" projects will have variations on the above. All of these stages may not be present or necessary for many projects. At a minimum, three submissions are required. Those stages that are used will follow the standard design submittal process.*

10 percent Pre-concept/Parametric: This is typically prepared during a design charrette. It primarily serves two purposes. First, it provides at least three alternatives for arranging a project on a site. Optional footprints are provided for buildings, parking areas, access points, future expansion, etc. Security and force protection issues that impact site layout are discussed. From these various options, a preferred alternative is developed. This becomes the basis for proceeding to 30 percent design. Environmental issues that would impact the cost of the project are identified. Second, once the preferred alternative has been selected, a detailed programming/parametric cost estimate can be developed.

30 percent Concept: This submittal is a refinement of the 10 percent site plan. Initial development is done of building footprints and parking areas, access roads, utilities, stormwater management, terrain and landscaping. The building is defined by a foundation plan, floor plan, elevations and roof plan. Initial utility runs are shown for water, sewer, gas, electric, communications, storm drainage and HVAC. Although no utility may be completely defined, sufficient detail is provided such that the reviewer knows the intent of the designer. Security and force protection setbacks will be identified on the site plan. This should be the last opportunity to make significant design changes, such as floor plans, elevations or site elements. This submittal includes a Design Analysis that explains the basis of the design presented, lists all applicable codes, regulations, policies, environmental constraints, required permits, preliminary LEED® evaluation, fire protection and other design guidance that will be used to proceed to final design. Marked up specifications are a part of this submittal. This submittal is the basis of the initial NCPC submission.

60 percent Preliminary: This submittal is primarily used on large projects where considerable design work occurs between 30 percent and 90 percent. It is a mid-point pause to ensure the design is proceeding correctly. This is a continuing refinement of the 30 percent submittal. Details are being provided for all drawing disciplines. Final specifications should be provided. The design analysis will include all comments submitted for the 30 percent design, with final responses.

90 percent Final: This is the last draft design submittal. All drawings should be complete, including details and notes. This is the most important design submittal because all details should be present. It is the last chance for reviewers to identify and correct errors or omissions at minimum cost, thus justifies maximum reviewer time by all disciplines. The final Design Analysis will reflect the design presented. There will be resolution of all environmental issues and the

final LEED® evaluation presented. The submittal includes a list of all comments received thus far and the responses. For projects not using a 60 percent submittal, final specifications will be provided. A draft DD Form 1354, Transfer of Real Property, is included in this submittal.

95 percent Back check: This is used by the design agency as a final check that all comments have been incorporated and the design is now biddable and buildable. It is sent out to reviewers as needed or requested.

100 percent Solicitation: This is the complete design package that is ready to go out for bids. At this stage, any errors or omissions detected can only be corrected through bid amendments. This process may result in an extension of the bid closing date. Two complete sets of the solicitation package will be provided to the DPW Facility Planning Office when the project is released for bidding.

Construction Phase

Preconstruction meetings are encouraged for all projects in order to establish project requirements, participants, and processes. Construction on a military installation is similar in some ways to the private sector but does have distinct differences. Major requirements on Fort Belvoir during the construction phase of a project are listed below.

- Projects requiring disturbing greater than 2,500 square feet and requiring design approval ultimately require a DPW Land Disturbance Letter (LDL) to begin construction. There are several steps that must be accomplished prior to obtaining an LDL including:
 - Site plans including Phase 1/Phase 2 erosion and sediment control plans (with associated calculations, narrative, and details) must be approved by DPW. Three copies of signed/sealed final plans from a Virginia licensed Professional Engineer must be submitted for the DPW Director's signature.
 - Stormwater Pollution Prevention Plan (SWPPP) must be reviewed and approved by DPW.
 - VSMP registration statement submitted to DPW.
 - Site Utilization Plan approved by DPW showing construction trailer site, material laydown areas, and haul route (large projects).
 - Environmental Protection Plan (EPP) is mandatory on USACE-managed Military Construction (MILCON) projects and is often used by other construction management entities such as the Army and Air Force Exchange Service (AAFES).
 - DPW Excavation Permit (Dig Permit) is obtained after all prior submittals above are received and approved.
 - LDL is then issued.

- Under Fort Belvoir's MS4, erosion and sediment control inspections are required on every active construction site. E&S inspections are performed by the ENRD and occur every 2 weeks or within 48 hours of a half-inch rainfall event.
- Recurring progress meetings involving the construction team and Installation personnel are greatly encouraged to ensure communication lines are intact and construction timelines are maintained. Meeting frequency should be based on the size and complexity of the project. Larger projects such as MILCON projects managed by the USACE may include an intensive partnering effort to ensure that complex issues are addressed and delays minimized.

Post-Construction Phase

- The DES (Fire Department) is responsible for performing final life safety inspections and testing on new construction projects. This includes, but is not limited to, fire alarm systems, fire suppression systems, proper egress requirements, fire lane access and Knox Boxes. Once approved, the DES will issue an occupancy permit allowing the facility to be utilized by the user.
- Once construction is complete, the facility must be accepted by the government. This is accomplished using a Form 1354 (Transfer of Real Property). The form lists all real property items or improvements transferred to the government for ownership and maintenance. The DPW Facility Planning – Real Property office manages the 1354 process and will assist contractors in completing the forms.

Along with the form 1354, supporting items are required before the government can accept a facility. Depending on the scope of the project, this may include final as-built plans, operations and maintenance manuals, and permanent keys and cores.

A final walk-through inspection is generally performed by DPW prior to accepting the facility to ensure all punch list items are completed and RFP requirements met.

- As a closeout item, project teams must provide warranty information to the government for all applicable items. Manufacturer warranties as well as subcontractor information must be provided in case of equipment or systems failure within the warranty period. New facilities may require a Warranty Plan in order to organize all the necessary information. Larger projects may include scheduled warranty inspections at certain intervals as well as one year warranty meetings.

Army Installation Planning Standards Compliance Checklist

A completed Design Team IPS 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 IPS 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.

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 percent, 60 percent, and 90 percent for each MILCON project). 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 USACE, NAF, AAFES, Host Nation, mission partners, etc.) shall have the prospective design build contractors submit a completed IPS 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.

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.

Army Installation Planning Standards Compliance Checklist

Project Title and Description			
Title			
Description			
Project Justification			
Sustainable Design		Yes	No
Has LEED Checklist been attached? (If not, obtain completed checklist)			
Does LEED meet or exceed the Silver level? ("Silver" is the standard for all MILCON vertical construction projects currently under design.)			
Complies with the most current Energy Policy Act?			
Site Planning - Chapter 2		Yes	No
Was a site plan prepared for the proposed project utilizing the IPS Design Process included in the IPS?			
Does the site plan include Site Planning Design Component guidelines of the IPS?			
Does the site plan meet AT/FP requirements?			
Does the site plan address stormwater management, Low-impact development, and other erosion and sediment controls?			
Designer Comments on Site Planning:			
Does Site Planning comply with the IPS? If not, provide justification.		Yes	No
Does Site Planning meet approved installation master plan siting compliance? If not, provide justification.		Yes	No
Has NEPA been initiated for the construction effort in accordance with the most current Army Regulations?			
Has airspace criteria been considered relative to airfield accident potential zones?			
Buildings - Chapter 3		Yes	No
Does the building exterior design meet the Building Design objectives defined in the IPS?			
Is the exterior building designed to meet the Structural Characteristics defined in the IPS?			
If the project is a renovation or addition, does the proposed renovation or addition meet IPS building design and structural characteristics?			
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?			
Does the building exterior design meet AT/FP requirements?			
Designer Comments on exterior Building Design:			

Does Building Design comply with the IPS? If not, provide justification.	Yes	No
Circulation - Chapter 4	Yes	No
If the project includes roadway construction, does the proposed plan meet Federal Highway and/or local guidelines?		
If the project includes roadway construction, does the proposed plan meet AT/FP roadway setback requirements?		
If the project includes roadway construction, does the proposed plan include applicable roadway alignment and intersection guidelines defined in the IPS?		
If the project is an entrance gate, does the proposed plan include entrance gate guidelines and standards defined in the IPS?		
If the project includes parking, does the proposed plan meet the Parking Lot Location/Design guidelines defined in the IPS?		
If the project includes pedestrian circulation, does the proposed plan meet the Walkways and Pedestrian Circulation Guidelines in the IPS?		
If the project includes bicycle circulation, does the proposed plan meet the Bikeway Guidelines in the IPS?		
Designer Comments on Circulation Design:		
Does Circulation Design comply with the IPS? If not, provide justification.	Yes	No
Landscape Material - Chapter 5	Yes	No
All projects for new construction should include planting of trees, shrubs and/or groundcover. Does the proposed planting plan include a project plan?		
Does the proposed planting plan meet AT/FP requirements defined in the IPS?		
Does the proposed planting plan include plant material recommended in the selected Plant Palette Matrix included in the IPS?		
Designer Comments on Landscape Design:		
Does Landscape Design comply with the IPS? If not, provide justification.	Yes	No
Site Elements - Chapter 6	Yes	No
If the project includes Site Furnishings, does the proposed plan follow the guidelines in the IPS?		
If the project includes Signs, does the proposed plan meet the Signs standards?		
If the project includes exterior Lighting, does the proposed plan meet the exterior Lighting guidelines defined in the IPS?		
Does exterior lighting conform to the aesthetic character of the Post's Historic District, and to historic properties next to the Installation?		
Does the exterior lighting conform to standards of light pollution and glare reduction, as well as promote energy saving?		
Will all power and other distribution lines be located underground?		
Will all substations and transformers be designed to be screened from view?		
Will all sewer and water lines be located underground?		
Are all storm drain systems designed to meet the guidelines defined in the IPS?		
Designer Comments on Site Elements Design:		
Does Site Elements Design comply with the IPS? If not, provide justification.	Yes	No

Anti-Terrorism (Security) - Appendix A		Yes	No
Have installation boundary setbacks been included?			
Have building setbacks from roads, parking, other buildings been included?			
Do site plans and landscape plans include the criteria outlined for AT/FP?			
Designer Comments on AT/FP Design:			
Does AT/FP Design comply with the IPS? If not, provide justification.		Yes	No
I hereby certify that the information provided is in compliance with the guidelines of the installation or applicable IPS, except as justified as non-compliance.			
Designer of Record		Date	
Concur			
Deny, Explanation of denial is attached.			
IPS Coordinator		Date	
Accept			
Deny, Explanation of denial is attached.			
Command Review (Where Applicable)		Date	

Project Requirements Checklist

The following checklist is optional and is designed for use on major projects. It is a helpful tool in ensuring that individual projects follow the IPS guidelines established in this manual. 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.,

DFMWR, DPW, etc.) about wants, needs, etc. The A/E that prepares the RFP must have the specific guidance contained herein to ensure that projects meet the minimum of compliances that exist. Additional information beyond the requested items in this checklist may be provided to further explain the intent of a specific project. Additional information may also be requested at the discretion of the DPW.

PROJECT		LOCATION	
DPW/DIS POC		PH#	
ADDRESS:			
EMAIL			
DATE CHECKLIST COMPLETED		BY	

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, 28 November 2011](#)

Local Building Codes:

State and County Codes:

Environmental Regulations:

Installation Regulations:

Cultural Regulations:

Other:

National Fire Protection Codes (NFPA), [UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 14 July 2009](#)

1.1 TEMPORARY FACILITIES AVAILABLE TO THE CONTRACTOR		
ITEM	YES	NO
A. Facilities available to contractor during construction:		
1. General Site Plan has been annotated to show limits of construction site including parking areas and laydown/storage areas: If the contractor requires the use of additional area, he must obtain written approval from the Contracting Officer.		
2. Construction Office available:		
3. Covered materials storage available:		
4. Uncovered materials storage available: 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: 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:		
Cost \$ _____ per _____	Metering required:	
2. Non-Potable Water (Irrigation, Machine Washing, etc.):		
Cost \$ _____ per _____	Metering required:	
3. Electricity:		
Cost \$ _____ per _____	Metering required:	
4. Natural gas:		
Cost \$ _____ per _____	Metering required:	
5. Sanitary sewer:		
<p><i>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.</i></p>		
1.2 DEMOLITION REQUIREMENTS		
ITEM		
<p>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. Consider demolition hazards. 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 whenever possible.</p>		
1.3 PAVING REQUIREMENTS		
ITEM	YES	NO
A. Parking area(s) required:		
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:		
5. Striping of parking spaces required:		
Width of stripes _____ Type of paint to be used _____		
6. Special signage required:		
7. Concrete wheel stops required:		
8. Handicapped ramps/depressed curbs required:		

B. Service road(s) required:		
1. Location:		
2. Type pavement:		
3. Concrete curbing required on both sides of road:		
4. Minimum roadway width: _____ Feet _____		

List any other special paving considerations or needs:		
C. Sidewalks required:		
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:		
1. Number of pad(s): _____ each. <i>See note below.</i>		
2. Size of each pad: _____ feet by _____ feet.		
3. Provide bumper stops at rear of pads:		
4. Provide architectural screening of pads:		

Type:		
NOTE: Building orientation or design may eliminate need for screening. Screening shall be in accordance with the Army Installation Planning Standards (IPS).		

1.4 UTILITIES SERVICE REQUIREMENTS		
ITEM	YES	NO
A. Electrical Service: Meter required:		
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 Planning Standards (IPS).		
3. Available Voltage:		
4. Location of tie-in point:		
B. Water Service: Meter required:		
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:		
1. For Heating:		
2. For domestic hot water:		
3. For laundry dryers:		
4. For kitchen equipment:		
5. Size and location of tie-in point:		
<p><i>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).</i></p>		

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: _____

b) Maximum time road can be closed: _____

c) Can road be closed over a holiday or weekend: _____

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 be closed to traffic: _____

b) Maximum time road can be closed: _____

c) Can road be closed over a holiday or weekend: _____

3. Railroad Track Closing:

a) Can track be closed to traffic: _____

b) Maximum time track can be closed: _____

c) Can track be closed over a holiday or weekend: _____

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:		
6. Are samples, ultra-sonic inspections, temperature recordings, and certificates to be submitted for ties, rail track components, or ballast:		
7. Are RAILER markings and reporting required:		
8. Are there special radio or communication requirements:		
<i>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.</i>		
1.5 ARCHITECTURAL AND STRUCTURAL BUILDING DESIGN REQUIREMENTS		
ITEM	YES	NO
A. Seismic Design Zone: <i>Structural design shall be in accordance with codes specified in the RFP.</i>		
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:	(If a parapet type roof is proposed);	
4. Gutters and downspouts: Type: _____		
5. Drainage carry off: _____ Splash Blocks; or _____ Underground drainage system (internal roof drains not permitted.)		
6. Access to roof:		
<i>NOTES: Catwalks to and around rooftop HVAC units and other equipment are required. Where possible, architectural screening of visible rooftop equipment is required.</i>		

G. Site Conditions:		
1. Environmental Assessment required:		
Completion Date: _____		
EIS Required:		
Completion Date: _____ (Provide copies of actions to date).		
2. Cultural Resources Compliance Completed:		
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:		

At project location:		

Other:		
5. Soil bearing capacity: _____ PFS. Actual test _____, Assumed _____		
<i>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.</i>		
H. Building Exterior: Brick:		
Other:		
<i>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.</i>		
<i>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>		
I. Barrier Free Requirements: (Where applicable) as minimum, _____ guest units shall be barrier free.		
<i>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).</i>		
J. Kickplates required on interior wood doors:		

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

ITEM	YES	NO
A. Exterior lighting:		
1. Parking area(s) lighting required:		
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:		
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:		
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:		
NOTE: All electrical wiring (exterior and interior) shall be copper.		
B. Outside weatherproof receptacles: Installed every ____ feet along the building exterior. Outside weatherproof receptacles should be RCD (GFCI) protected.		
NOTE: Building shall have emergency light fixtures and exit lights in accordance with NFPA. 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		
ITEM	YES	NO
A. Heating design data:		

1. Below is the outside dry bulb temperature that is equaled or exceeded 97.5 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 97.5 percent of the time.		

a) Dry bulb temperature: _____.		

b) Wind velocity: _____.		

c) Degree days: _____.		

2. Interior design temperatures: 68 degrees F.		

B. Air conditioning design data:		

1. Outside dry bulb and wet bulb temperatures that are equaled or exceeded 2.5 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 2.5 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 (97.5 percent 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 35 degrees F shall be provided when it can be clearly shown that use of the economy cycle is cost effective.		

E. Install humidity control override:		
F. Automatic timer controls required for:		
1. Heating System:		
2. Air Conditioning System:		
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:		
I. Automatic timer controls required for:		
1. Heating System:		
2. Air Conditioning System:		
J. Heating fuel to be used: Fuel: Natural gas, #2 Fuel oil, Propane.		
K. Dual fuel heating plant required:		
Primary Fuel _____, Secondary Fuel _____.		
L. Outside air supply intake: to close when building is unoccupied:		
M. Outside air supply intake: to close when building is unoccupied:		
N. Type heating and air conditioning filters required: () Permanent () Throw away		
O. Covers and locks: required on interior utilities controls:		
P. Plumbing Design Data:		
1. Exterior hose bibs: Minimum of _____ each with 3/4" hose connection on building exterior.		
a) Frost protection required:		
b) Removable cutoff handles required:		
2. Interior hose bibs: See Functional Requirements		
3. Grease trap(s) required:		
Location(s):		
4. Commodes shall be floor mounted flush valve type.		
5. Lift station required:		

6. Hot water heater(s) required:		
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:		
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.		
10. Provide grease interceptor:		
Location:		
11. Provide a water filtration system:		
Location:		
Type:		
12. Other plumbing considerations or requirements:		

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		
ITEM	QUANTITY	SPECIAL REQUIREMENTS
Lavatory		
Commode		
Faucets		chrome finish
Expose pipes/valves		chrome finish
Pipe penetrations		chrome finish escutcheons
Clean outs		chrome covers
Mirrors		mech. wall fasteners. Lighting
Floor drain		each restroom
Hose bib		under lavatory in each restroom
Wall finish		ceramic tile to 5' height
Ceiling		moisture resistant dry wall (DW)
Floors		ceramic tile w/ceramic tile base, or quarry tile w/quarry tile base Tile shall be MUD-SET.
Toilet Partitions		at all commodes and urinals. overhead braced w/door bumpers, baked enamel w/skirts
Skirts		18" stainless steel. watertight top edge
Duplex receptacle		GFCI type over vanity
Paper towel dispenser with trash receptacle		recessed in wall
Hand dryer		over each lavatory
Soap dispenser		liquid pump
Toilet paper dispenser		each commode stall
Ash receptacle		recessed, each restroom
B. Specific: WOMENS		
Sanitary napkin disposal		each commode stall
Sanitary napkin disposal		each restroom, coin operated
C. Specific: MENS		
Urinal		porcelain wall mounted w/stainless steel part

NOTE: Each restroom shall be designed and constructed with provisions for the handicapped and shall conform to the latest edition of the National Standard Plumbing Code and the Uniform Federal Accessibility Standards published in the Federal Register, August 7, 1984 (Current Edition).

Fire Protection Requirements

ITEM	YES	NO
A. Sprinkler system required:		
1. Type system to be installed: _____ Wet, _____ Dry.		
2. Complete coverage throughout the structure:		
If no, describe proposed system, layout, etc.:		
3. Exterior siamese connections are required.		
B. Detection System:		
1. Smoke detectors required:		
NOTE: Radium type shall not be used.		
2. Heat detectors required:		
(Rate of Rise Heat Detectors shall not be permitted.)		
<p><i>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 135° 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.</i></p>		
<p>C. Manually Activated Fire Alarm System: Required installed in accordance with the latest edition of the NFPA in effect at the time of installation. 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.</p>		
D. Special fire suppression system(s) required:		
Describe type, location, and justification:		
E. Fire extinguishers (manually operated) are required.		
1. Government furnished:		
2. Quantity and locations shall be based upon building design, NFPA, requirements, and coordinated with Installation's fire department.		
3. Recessed cabinet mounted:		
<p>NOTE: The Contractor shall furnish and install the recessed fire extinguisher cabinets. The cabinets shall be at a minimum 24 1½" tall, 7" deep and 8.5" wide w/glass doors.</p>		
<p>F. All interior finish materials shall be per NFPA standards and UFC 3-600-01, Design: Fire Protection Engineering, 17 April 2003.</p>		
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:		

Security Requirements

ITEM	YES	NO
A. Building physical security:		
1. Intrusion detection system required:		
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:		
1. Type system to be installed.		
2. Location(s):		
B. Safe(s) required:		
1. Type and Number:		
2. Size:		
3. Location(s):		
4. Secure to building:		
if yes, how:		
5. Connect to main intrusion alarm system:		
C. Remote transmission of the intrusion alarm system: to the Installation's master system required:		
<p>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.</p>		
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:	<div style="background-color: #cccccc; width: 100px; height: 20px;"></div>
Location(s):	
H. Fencing Requirements:	
1. Location:	
2. Type and height:	
3. Gate requirements:	
I. Anti-terrorism 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.	

Communications Requirements

ITEM	YES	NO
A. Intercom system required:		
Give a brief description of the requirements for the system:		
B. Music/Paging system required:		
Give a brief description of the requirements for the system:		
C. Telephone system required:		
Location:		
Type:		
Pay telephone required:		
<p>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 DPW office and the local telephone company to determine requirements and provide space for communication equipment, panels, etc. in the mechanical room or where otherwise designed.</p>		
The basic telephone system shall be the "Centrax System" as provided by:		
The 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:		
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.		
<p>E. Mass Notification System (Required per UFC 4-010-01 - DoD Minimum Antiterrorism Standards for Buildings, 22 January 2007, Standard 23: for New Inhabited Buildings and for Existing Buildings (Primary Gathering and Billeting), also for Existing Buildings, Recommended for all Inhabited Buildings)</p>		
Type of Mass Notification System Required:		

Signage Requirements

(Excluding those required by NFPA and OSHA)

D. Interior signage:

E. Exterior Signage:

All exterior signage shall conform with the Army Installation Planning Standards and Post Wide Paint/Exterior Finish Standards and color charts.

Other Requirements

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Technical Design Guidelines Overview

This appendix outlines guidelines pertaining to federal and state regulations regarding facilities and the built environment, Army regulations, and specific requirements for key installation construction elements including:

- Building Accessibility (Americans with Disabilities Act [ADA])
- Historic Preservation
- Locks and Locking Devices
- Seismic Policy
- Facility Types Standardization
- Plant Material Selection and Palette
- Plant Material Installation/Care
- Natural Landscapes
- Streams and Wetlands
- Outdoor Lighting Guidelines
- Force Protection



Building Accessibility

All structures or facilities, other than the exceptions mentioned here, must meet the ADAAG and the UFAS for accessibility. The more stringent standards apply in the event of conflicting guidelines.

Any building or facility that is specifically restricted by occupancy classification for use by only able-bodied personnel during its expected useful life need not be accessible (military exclusion is provided by UFAS 4.1.4 [2]); however, accessibility is recommended, as the intended use of the facility may change over time.

In particular, the following facilities need not be designed to be accessible: unaccompanied personnel housing, closed messes, vehicle, and aircraft maintenance facilities.

Historic Preservation

Military Planning and Design

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.

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.

National Historic Preservation Act

The Army's management of historic properties is pursuant to the duties and responsibilities established by Congress under the 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)

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)



An example of a historic building that is used and maintained on Post. (Building 216, Fort Belvoir)

The NHPA has established a number of procedural steps, which federal agencies must meet to comply with 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, building, 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 ACHP established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking.” (16 U.S.C. 470f)

Pursuant to its authority in overseeing the nation’s historic preservation programs, the Department of the Interior has developed regulations which set 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 SHPOs in their procedural review of federal undertakings. These guidelines shall 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 will meet Advisory Council and NHPA requirements.

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 NHPA, 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.

Federal agencies must comply with the NHPA by following a series of steps detailed in 36 CFR 800 - Protection of Historic Properties. The Army further explains its policies and procedures in Army Regulations (AR) 200-1, Cultural Resources Management. This IPS is intended to be used in conjunction with the above regulations as well as with the Fort Belvoir Integrated Cultural Resources Management Plan (ICRMP). When working with historic properties, the Army uses the following three categories:

- **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. Generally, buildings or structures eligible for listing in the National Register are at least 50 years old. Those structures less than 50 years of age must be exceptionally important to be considered eligible for listing.
- **Historic District.** This is a distinct group of buildings, structures, or landscapes that possesses significance, and is listed in or eligible for listing in the National Register.
- **National Historic Landmarks.** National Historic Landmarks (NHL) are nationally significant historic properties that represent an outstanding aspect of American history and culture. NHLs are designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States beyond that of National Register.

For further guidance on policies and procedures, see the Army Corps of Engineers guidance found in the TI 800-01, Chapter 16, Preservation of Historic Structures and (36 CFR 63) - Department of the Interior, Determinations of Eligibility for Inclusion in the National Register of Historic Places.

Standards and Guidelines

Rehabilitation of Historic Properties

Design and renovation guidelines for historic districts, such as those within the Installation, out of necessity are much broader than design guidelines for single structures. Such guidelines must address the appropriate architectural character (style, material, etc.) for proposed new buildings, and also speak to how a proposed action within the historic district will impact its integrity, or affect the original design intent.

New work shall not: Conflict with the existing architectural character. For example, it shall 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.

New work shall: Seek to enhance and protect the historic quality and existing resources. For example:

- Be constructed only after a survey examining the level of use of existing facilities is conducted to determine if there is a need for construction.
- Follow the Standards and Guidelines for Historic Preservation as recommended by the Secretary of the Interior.

Provide necessary modern conveniences as unobtrusively as possible. For example, it shall:

- 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 or when feasible utilize parking structures.
- Utilize enclosures, fences, walls, and landscaping to screen and hide parking areas and modern mechanical equipment from view.

Phase out (gradually eliminate) existing intrusions. Intrusions are defined as buildings or structures that disrupt the overall character of the historic district. When identifying intrusions in an area, qualities such as scale, size, building materials, and function should be considered. This should be tempered with an understanding of the evolution of the area and consider the impact on the built environment of historical forces and shifts in architectural taste. For example, it shall:

- Demolish structures designated as intrusions within the Fort Belvoir National Register-eligible Historic District when they are no longer needed.
- Restore buildings that have been altered by inappropriate color schemes, replacement windows, porch enclosures, etc. Any restoration work will meet the DoD Historic Building Guidelines and the Secretary of the Interior's Standards.
- Modify existing intrusions to lessen their effect on historic properties and reduce their disruption to the district.

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.

Standards for Historic Preservation Projects

Compatible use of historic sites and structures.

- Every reasonable effort shall be made to use a historic structure or site for its originally intended purpose or to provide a compatible use. The use shall 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 shall be regulated to prevent alterations that are potentially damaging to historic fabric and/or cultural context.

Retention of character defining features.

- Distinguishing stylistic or character defining features and examples of skilled craftsmanship shall not be destroyed, altered, or removed from a historic site or structure. All such fabric shall be treated with sensitivity and preserved in its original context and form.

Treatment of deteriorated historic fabric.

- Deteriorated historic fabric shall be repaired rather than replaced whenever possible. When replacement is unavoidable, new material, whether man-made or natural, shall match the existing fabric in composition, design, color, texture, and other visual/structural qualities.

Documentation of missing historic elements.

- Replacement of missing historic elements shall 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.

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 shall be respected and their potential significance carefully evaluated.

Unacceptable alterations.

- Historic sites and structures shall 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.

Acceptable alterations and additions.

- When possible, alterations and new additions to historic structures or sites shall be done in such a manner as to leave the essential form and integrity unimpaired.

Contemporary design in a historic context.

- Contemporary design for additions to existing historic sites or districts shall not be discouraged if such design is compatible with the massing, proportions, scale, materials, color, views, and general contextual relationships of the place.

Surface cleaning methods.

- Surface cleaning of structures or buildings shall 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 can damage historic material or speed their deterioration, are discouraged.

Archaeological resources.

- All survey, excavation and evaluation work, which affects surface or sub-surface prehistoric or historic archaeological resources, shall be coordinated with an archaeologist. The archaeologist shall meet the Secretary of the Interior's Professional Qualification Standards.
- All surveys shall complete all work in accordance with Guidelines for Conducting Cultural Resource Survey in Virginia (Virginia Department of Historic Resources and The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716, 1983).
- Surveys conducted at Fort Belvoir's remote sites located in Maryland shall be performed in accordance with the Standards and Guidelines for Archeological Investigations in Maryland.

Historic preservation and maintenance.

- The guidelines contained within this IPS are general in nature. The IPS must be utilized in conjunction with the Installation ICRMP, existing Programmatic Agreements and all other relevant preservation guidelines.

Guidelines for Historic Preservation Projects

Roof Guidelines

- Preserve existing historic roofing. Repair and patch with historically accurate/sensitive materials.
- All roofs shall receive an annual inspection. Repair and patch all materials as needed and clean out all gutters and drains.
- When full replacement of the roof becomes necessary, replace or restore with historically accurate or appropriate 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.

Wall Guidelines

- Limestone and brick masonry.
 - Clean only when necessary using the gentlest possible means.
 - Repair or replace deteriorated or missing units as needed.
 - Work shall be performed in accordance with the *National Park Service, Preservation Brief #1, Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings.*
- Stucco.
 - Repair damaged or deteriorated stucco.
 - Repaint only when necessary with appropriate color based on analysis of historic paint.
- Wood.
 - Retain or repair wood siding; where replacement is necessary, match existing clapboards in width and species.
 - Repaint only as needed to maintain moisture protection.
 - Use color scheme based on analysis of existing paint layers.

Porch Guidelines

- Retain or maintain existing original porches.
- Remove historically inappropriate porches.
- Where possible, restore original porches that have been removed or enclosed.

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.
- Repair existing historic windows in accordance with *National Park Service, Preservation Brief #9, and the Repair of Historic Wooden Windows.*

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.

Color Guidelines

- If historic buildings must be repainted before an accurate color scheme is developed, a very conservative approach shall be followed. Repaint to match the existing colors or use 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.

Painting Guidelines

- Do not undertake a paint job until any problems with leaking water have been solved. All gutters and downspouts shall 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.

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 shall be carefully planned and undertaken so that they do not adversely affect the design of main entrances or principal façades.
- 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 façades, 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 shall match existing porch railings.

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 shall be planned in order to make the least visual impact.
- Where possible, locate mechanical equipment within the building.
- Screen necessary surface equipment with vegetation, enclosures, fences, or walls.
- When large groups of buildings are upgraded as one project, consider the use of a remote system.

Guidelines for Additions

- Additions shall 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 shall be followed.
- Avoid changes that impact primary façades.
- Note that some highly visible freestanding buildings may not have a secondary façade, and thus additions are not advisable.
- Scale down additions so that it makes the least visual impact.
- Design shall establish a clear and obvious difference between the existing historic structure and the new addition.

Force Protection

These guidelines shall be used in conjunction with the UFC 4-010-01, DoD Minimum Anti-terrorism Standards for Buildings and the Force Protection Design Standards of this Army Installation Planning Standards and Standards.

Locks and Locking Devices

This section discusses the implementation guidance for programmable electronic key card access systems. Policy regarding these systems is found in the memorandum issued 14 December 2004, which requires the use of electronic, programmable electronic key card access systems for all new construction and major building renovations. The memorandum can be found online at the Army Installation Design Standards Policy Newsletter that is provided by the Assistant Chief of Staff for Installation Management and Director Installation Management Command (https://secureapp2.hqda.pentagon.mil/acsimnews/article/ns_art17.cfm). See Memorandum for Record, Subject: The Army Standards for Electronic Key Card Access for all Facilities.

- Beginning in FY 2007, 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 FY 2006 and Congressional add projects that are less than 35 percent designed will be evaluated on a case-by-case basis to determine if electronic key card access systems shall be incorporated.
- Technical implementing guidance will be developed by Headquarters, Department of the Army (HQDA) and fielded by December 2005. The intent of the current policy memorandum is to utilize card access systems on interior/exterior doors where keys are provided to successive mission partners 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.
- Each Army installation will develop a master plan for the Electronic Key Card Access system. The master plan shall specify that all buildings will use equipment from a single manufacturer so that there is consistency, compatibility, and sustainability across installed equipment. Each installation will be responsible for obtaining the appropriate sole source justification for their installation in coordination with the IMCOM region.
- In keeping with the Transient Lodging Standards, spaces for access by DPW personnel may retain key systems until project completion and key conversion access can be executed to the new occupant. If a new building is constructed on an installation that already has electronic key card access equipment on existing buildings, the requirement for compatible equipment for the whole installation shall be implemented.
- 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 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 a facility's useful life through alterations or repairs, or will significantly increase a facility's value, and the cost exceeds 30 percent 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 building is added to the Army inventory through purchase or donation.

Exceptions to Seismic Evaluations.

Existing facilities are exempt from seismic evaluation if:

- It is located in a region of Low Seismicity, having SDS < 0.167g and SD1 < 0.067g, unless it is designated as mission essential. (SDS and SD1 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 SDS < 0.40g.
- It is a detached one- or two-family dwelling, two stories or less, located where SDS < 0.40g, if it meets the light frame construction requirements of the Federal Emergency Management Agency (FEMA) 368/369, 2000 National Earthquake Hazards Reduction Program (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 one-story of 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 Interagency Committee on Seismic Safety in Construction (ICSSC) Recommended Practice (RP) 6, National Institute of Standards and Technology Interagency Report (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 was designed

Seismic Policy

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 evaluations.

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 American Society of Civil Engineers (ASCE) 31-03, Seismic Evaluation of Buildings, when:

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 five years.
- It has already been seismically rehabilitated in compliance with the provisions of ICSSC RP4, NISTIR 5382, Standards of Seismic Safety for Existing Federally Owned or Leased Buildings.
- It is a special structure, such as a brIPSe, transmission tower, industrial tower or equipment, pier, wharf, or hydraulic structure.

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 Major Army Command (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, Pre-standard and Commentary for the Seismic Rehabilitation of Buildings, and UFC 3-301-05A, Design: Seismic Evaluation and Rehabilitation for Buildings.

New Facilities or Additions/Extension of Existing Facilities.

New facilities and additions/extension of existing facilities will be designed to provide the level of seismic protection required by UFC 1-200-01, Design: General Building Requirements; IBC 2000; UFC 1-300-05A, Installation Support; and UFC 3-310-03A, Design: Seismic Design for Buildings.

Table B.1: Army Facilities Standardization Program

Design No.	Program Title	Design No.	Program Title
017-01-01	Railroad Crossing Construction	035-14-05	Ammunition Maintenance Facility, 269 Rocket and Guided Missile
017-01-02	Railroad Bed Construction	035-69-06	Workshop, Weapons Surveillance
017-07-01	Inspection Pit, Tower and Platform for Moving Cars	035-69-09	Ammunition Maintenance Building
017-07-02	Inspection Pit for Railroad Spur Suspect Car	036-40-23	Aircraft Washing Apron, Army
026-20-01	Septic Tank Standard 1,000 to 2,000 Gallons	036-49-03	Ammunition Maintenance Facility, Lunch Room - Change Room
026-20-02	Septic Tank Standard 500 to 2,000 Gallons	038-05-03	Steel Flag Pole of 10.24m, 18.3m, 22.9m
028-13-03	Range, 600 INCH USAR Firing, U.S. Army Reserve	039-19-01	Canine (K9) Kennels - 8, 20, 24 and 64 Dogs, Air Force
028-13-95	Confidence Course	039-19-02	Canine (K9) Kennel, 8 Dogs
028-20-01	Army Reserve Annual Training Facility, 15 Buildings	040-01-41	Cage-Type Strong Room Detail, See Standard 040-21-01
030-16-01	Courtroom Facility with Judge	040-06-04	Electrical Lighting Fixtures
031-25-02	Handball Court Building with 4 Courts	040-06-05	Army Aviation Lighting Fixtures
031-25-03	Handball Court Building with 2 Courts	040-07-22	Standard Water System
033-15-06	Magazine, Mounded Concrete Igloo	040-08-02	Sanitary Sewer Standard Manhole
033-15-58	Magazine, Stradley Type Earth-Covered Atomic Blast Resistant	040-17-01	Pavement, Joint Detail
033-15-61	Magazine, Stradley Type Earth-Covered See Standard 033-15-74	040-17-02	Pavement, Joint, Curb and Gutter Details, Non-Reinforced
033-15-62	Magazine, Concrete Igloos Install Larger Doors	040-21-01	Cage Security
033-15-63	Igloo, Storage, Steel Arch Earth-Covered	040-26-01	Security Screens Intrusion Detection Device
033-15-64	Igloo, Storage, Steel Arch Earth-Covered	060-04-17	Observation Bunker
033-15-65	Magazine, Earth Covered Steel Arch	060-14-05	Vacuum Collector Building
033-15-65	Magazine, Steel Arch, Earth-Covered	060-18-07	Canine (K9) Kennel Support Building
033-15-71	Magazine, Earth Covered Steel Arch	071-14-16	Reservoir Ground Storage Permanent Prestressed Concrete, 1,000,000 Gallons
033-15-74	Magazine, Concrete, Oval-Arch, Earth-Covered	078-24-04	Standard Aircraft Bulk Fuel Storage Underground, 10,000 Barrels, Steel Tank Type
033-33-16	Magazine, Fire Hazard Storage	078-24-05	Standard Aircraft Bulk Fuel Storage Underground, 20,00 Barrels, Steel Tank Type
033-33-17	Destructor Building, See DEF 033-33-16	078-24-06	Standard Aircraft, Bulk Fuel Storage Underground, 50,000 Barrels Steel Tank Type
033-33-18	Consolidated Arms Storage Building	078-24-07	Standard Aircraft Bulk Fuel Storage Underground, 80,000 Barrels, Steel Tank Type

Table B.1: Army Facilities Standardization Program (continued)			
Design No.	Program Title	Design No.	Program Title
078-24-08	Standard Aircraft Bulk Fuel Storage Underground, 100,000 Barrels, Steel Tank Type	421-80-04	Underground Ammunition Storage Facility
078-24-18	Standard Airbase Tank Farm Facility to Supply Aircraft Re-fueler Trucks Only	421-80-05	Magazine, Pre-Cast Concrete, Earth-Covered
078-24-19	Standard Aircraft Underground Bulk Storage Tank Farm	421-80-06	Magazine, Modular Storage, Box-Type
078-24-20	Aircraft Fueling System for Army Aviation	422-15-01	Magazine, Concrete, Cubicle, Earth-Covered
078-24-23	Standard Area Reserve Tank Farm	432-11-01	Troop Issue Sustenance Activity
078-24-27	Aboveground Vertical Steel Tanks with Fixed Roofs	441-10-01	General Purpose Warehouse
078-24-28	Pressurized Hydrant Fueling System (Type III)	441-11-01	Central Issue Facility
078-24-29	Pressurized Hydrant Direct Fueling System	442-28-01	Hazardous Materials Storage Facility
078-24-33	Aircraft Fueling System with Underground Vertical Storage Tanks (Cut and Cover)	510-10-F	Ward - 46 Bed
078-25-01	Standard Bulk Alcohol Storage & Water Alcohol Blend System, Single Wing Base	510-10-S	500 Bed Hospital Site Plan
086-14-03	Compass Swinging Base Airfield and Heliport	610-41-04	Company Operational Facility
1110-1-170	Ammunition & Explosive Storage Facility	721-10-02	Unaccompanied Enlisted Personnel Housing
131-20-01	Information Systems Facility	721-81-01	Trainee Barracks
140-40-00	Aircraft Direct Fueling System	722-10-01	Enlisted Personnel Dining Facilities
140-40-04	Re-fueler Truck Loading System	724-10-01	Unaccompanied Officer Personnel Housing
140-40-05	Truck Unloading System	724-15-01	Visiting Officer Quarters
141-25-01	Military Entrance Processing Station	730-10-01	Fire Stations
141-32-01	Weapon Storage Area, Security Operations Building	730-17-01	Chapel, Army
141-32-02	Weapon Storage Area, Entry Control Facility	730-17-02	Chapel, Small
141-82-01	Brigade Headquarters	730-18-01	Chapel, Family Life Center
141-83-01	Battalion HQ w/o Classroom, Small	730-18-02	Chapel, Religious Education Facility
141-83-02	Battalion HQ w/o Classroom, Medium	730-90-01	Courtroom Facility with Members
141-83-03	Battalion HQ w/o Classroom, Large	740-14-01	Child Development Center, 60 Children
141-90-01	Class A Material Storage Vault, Top Secret	740-14-02	Child Development Center, 99 Children
141-90-02	Class B Material Storage Vault, Secret	740-14-03	Child Development Center, 122 Children
141-90-03	Class C Material Storage Vault, Confidential	740-14-04	Child Development Center, 145 Children
141-90-04	Arms Storage Room (Category II Arms)	740-14-05	Child Development Center, 145 Children
149-30-01	Barricades, Typical	740-14-06	Child Development Center, 244 Children
171-12-01	Combined Arms Tactical Trainer (CATT) Facility	740-14-07	Child Development Center, 303 Children
171-51-01	Battalion HQ w/ Classroom, Small	740-28-01	Physical Fitness Facility, 1600 m2
171-51-02	Battalion HQ w/ Classroom, Medium	740-28-02	Physical Fitness Facility, 3000 m2
171-51-03	Battalion HQ w/ Classroom, Large	740-28-03	Physical Fitness Facility, 3300 m2
171-51-04	2 Story Battalion HQ, Small	740-28-04	Physical Fitness Facility, 5350 m2
171-51-05	2 Story Battalion HQ, Medium	740-28-05	Physical Fitness Facility, 7200 m2
171-51-06	2 Story Battalion HQ, Large	740-28-06	Physical Fitness Facility, 8500 m2
214-10-02	Tactical Equipment Maint. Facility, Organizational	740-66-01	Youth Activity Center
214-20-02	Tactical Equipment Maint. Facility, Direct Support	750-90-01	Outdoor Sports Facilities
214-30-02	Tactical Equipment Maint. Facility, General Support	812-30-01	Weapons Storage Area Security Lighting System
216-12-01	Ammunition Surveillance Facility (6 Bay)	833-11-01	Refuse - Fire Heated Recovery Incinerator
216-12-02	Ammunition Surveillance Facility (12 Bay)	872-10-01	Weapons Storage Area, Fence Details and Vehicle Barrier
216-12-03	Ammunition Surveillance Facility Site Plans	872-50-01	Entry Points - Army Roadway Barriers & Hardened Gatehouse
421-80-01	Magazine, Steel, Semi-Circular Arch, Earth-Covered	872-90-01	Weapon Storage Area, Perimeter Warning Sign
421-80-02	Magazine, Steel and Concrete Box, Earth-Covered	872-90-02	Chain Link Fence
421-80-03	Magazine, Steel Oval-Arch, Earth-Covered		

Army Facilities Standardization Program

The Assistant Chief of Staff for Installation Management (ACSIM) establishes Army facility standards and approves deviations from the standards.

Department of the Army (DA), Facilities Standardization Program

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 percent) and once approved are mandatory for Army MILCON. 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.

Headquarters, USACE has established eight Centers of Standardization to develop and maintain the definitive and

design packages. The DA Facilities Standardization Program Centers of Standardization are listed at the end of this section, as well as the facility type assigned to each center. The Centers of Standardization homepage is URL: <http://www.hnd.usace.army.mil/stddgn/index.aspx>.

The AFSC has approved the Army Standards for each of the facility types listed in Table B.1.

Centers of Standardization

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.

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 HQ IMCOM POC.

Table B.2: Army Facilities Standardization Program - USACE Centers of Standardization

Assigned Center	Facility Type
Engineering and Support Center, Huntsville (CEHNC) P.O. Box 1600 Huntsville AL 35807 Telephone: 256-895-1673/1672/1535	Physical Fitness Facilities ■ Outdoor Sports Facility ■ Child Development Center (Infant/Toddlers) ■ Child Development Center (Infant/Toddler, Playground, School Age) ■ Youth Activity Center ■ Consolidated Fire, Safety & Security Facility ■ Fire Station ■ Army Community Service Center ■ Bowling Center RFP ■ Hazardous Material Storage Facility ■ Close Combat Tactical Trainer ■ Urban Assault Course ■ Training Ranges ■ Battle Command Training Center ■ Training Support Center
Great Lakes and Rivers Division, Louisville District (CELRL) 600 Martin Luther King Jr. Place Louisville, KY 40202 Tel: 502-315-6250	Army Reserve Center
North Atlantic Division, Norfolk District (CENAO) 803 Front Street Norfolk, VA 23510 Telephone: 757-441-7702	General Instruction Building ■ Classroom 21 ■ Enlisted Personnel Dining Facility ■ Family Housing RFP ■ Information Systems Facility ■ Criminal Investigation Facility ■ Information Systems Facility ■ Troop Issue Subsistence Activity Facility ■ Central Issue Facility ■ General Purpose Warehouse
Northwestern Division, Omaha District (CENWO) 215 North 17th Street Omaha, NE 68102 Telephone: 402-221-4552/443	Religious Facilities ■ Access Control Points ■ Airfields, Railroads, Pavements, BRIPSeS, & Dams
South Atlantic Division, Mobile District (CESAM) P.O. Box 2288 Mobile, AL 36652-2288 Telephone: 251-394-3600	National Guard Armory
South Atlantic Division, Savannah District (CESAS) P.O. Box 889 Savannah, GA 31402 Telephone: 912-652-5212	Company Operations Facility ■ Military Entrance Processing Station ■ Tactical Equipment Maintenance Facility ■ Unaccompanied Enlisted Personnel Housing, New & Modernization ■ One Station Unit Training Barracks ■ Unaccompanied Officer/ Senior Enlisted / Quarters ■ Unaccompanied Officer Quarters, Transient ■ Brigade/Battalion HQ ■ Operational Readiness Training Complex ■ Deployment Facility ■ Advanced Individual Training Barracks ■ Basic Combat Trainee
U.S. Army Engineer District, Tulsa (CESWT) 1645 S. 101st East Avenue Tulsa, OK 74128 Telephone: 918-669-7033	■ Advanced Individual Training Barracks ■ Basic Combat Trainee ■ Reception Barracks
CFSC Telephone: 703-681-1506	Army Lodging ■ Clubs/FBE Facilities ■ Golf Courses ■ Recreational Lodging

Plant Material Selection and Palette

The visual image conveyed by a military installation is greatly influenced by the landscape design. Chapter 5, Landscape Design Standards describes the required selection, placement, and maintenance of plant material at Fort Belvoir. Collectively plantings provide a simple and cost effective enhancement to the general appearance of the installation. Furthermore, plantings add an element of human scale to open spaces and can be used functionally to screen undesirable views, buffer adjacent uses, reinforce hierarchies, provide visual transitions between dissimilar land uses, enhance Force Protection measures, and promote sustainability practices.

Plant material selection shall be based on the following guidelines:

Basic Plant Selection

Trees, shrubs, ground cover, and turf are the major elements of a planting composition. Basic plant selection criteria shall:

- Consider creating a unified composition that utilizes at least 85 percent native materials for low maintenance and sustainability.
- Avoid use of incompatible colors, textures, and forms.
- Match the appropriate plant to the land use, situation, and environmental condition.

Hardiness and Use

The ability of plant material to provide lasting benefit is dependent upon the plant's hardiness and its appropriateness to the site use. Climatic conditions can be modified to an extent by specific site elements (such as wind protection, solar orientation, and planting design) to create microclimates. Major factors affecting plant hardiness are:

- Soil type and organic content
- Temperature
- Moisture and light

Composition

Selecting appropriate plants for a given condition is only one aspect of planting design. Compositional arrangement, which provides texture, variety, and accent to 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.
- How each plant relates and complements other plants in the design.



Plant choice can create a unified composition and complement adjacent buildings (300 Area, Fort Belvoir).

The following plant palette has been created to simplify this process of plant selection and placement. It provides a list of plants that are suitable for growth in the climatic conditions of Northern Virginia. Each plant is rated for its physical characteristics, cultural requirements, resistance to disease and insects, tolerance for urban conditions, and design function. To use the palette effectively, the design requirements for the specific site must be well defined.

The Plant Palette divides plant materials into the following eight categories:

- Deciduous shade trees
- Ornamental deciduous trees
- Evergreen trees
- Deciduous shrubs
- Evergreen shrubs
- Groundcover and vines
- Herbaceous plants
- Turf grasses

Within each of the categories, plants appear in alphabetical order by their botanical name. Other information includes: common name, design characteristics (such as type and growth), cultural information (such as salt tolerance and soil moisture requirements), and recommended use (such as street tree, hedge, and windbreak).

Table B.3: Plant Selection List

Plant Material Suitability Matrix	Characteristics														Culture					Use										
	Type		Growth			Flower			Interest			Light			Salt Tolerant		Resistant		Soil Moisture			Function								
	Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/shade	Sun	Low	Medium	High	Drought / Pollution	Pest	Moist	Average	Dry	Street tree	Shade tree	Screen	Massing	Windbreak	Hedge	Bank cover	Specimen
Name	Deciduous Shade Trees																													
Acer saccharum • Sugar Maple	■		■				■			■			■		■				■	■			■		■					■
Fagus grandifolia • American Beech	■		■						■	■			■	■					■	■			■		■					■
Ginkgo biloba 'Princeton Sentry' • Princeton Sentry Ginkgo	■			■						■			■		■		■	■		■	■		■			■				■
Gleditsia triacanthos var. inermis 'Skyline' • Skyline Honeylocust	■				■			■		■			■				■	■		■	■		■			■				■
Liquidambar styraciflua 'Rotundiloba' • Seedless Rotundiloba American Sweetgum	■			■						■			■	■					■	■			■		■					■
Liriodendron tulipifera • Tulip Poplar	■				■			■	■	■			■		■				■	■			■		■					■
Nyssa sylvatica • Black Tupelo	■		■							■		■	■		■					■	■			■		■				■
Quercus alba • White Oak	■		■							■			■	■					■	■	■			■		■				■
Quercus bicolor • Swamp White Oak	■		■							■			■	■			■		■	■			■		■					■
Quercus coccinea • Scarlet Oak	■			■						■			■		■					■	■			■		■				■
Quercus palustris • Pin Oak	■				■					■			■		■					■	■			■		■				■
Quercus phellos • Willow Oak	■			■						■			■		■				■	■			■		■					■
Quercus rubra • Red Oak	■				■					■			■		■				■	■			■		■					■
Quercus shumardii • Shumardii Oak	■				■					■			■	■					■	■			■		■					■
Taxodium distichum • Baldcypress	■			■					■	■			■		■				■	■			■		■					■
Ulmus americana 'Jefferson' • Jefferson American Elm	■			■									■		■				■	■			■		■					■
Ulmus americana 'New Harmony' • New Harmony American Elm	■			■									■		■				■	■			■		■					■
Ulmus americana 'Princeton' • Princeton American Elm	■			■									■		■				■	■			■		■					■
Ulmus americana 'Valley Forge' • Valley Forge American Elm	■			■									■		■				■	■			■		■					■

Table B.3: Plant Selection List (continued)

Plant Material Suitability Matrix	Characteristics														Culture					Use												
	Type		Growth			Flower		Interest			Light			Salt Tolerant		Resistant		Soil Moisture			Function											
	Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/shade	Sun	Low	Medium	High	Drought / Pollution	Pest	Moist	Average	Dry	Street tree	Shade tree	Screen	Massing	Windbreak	Hedge	Bank cover	Specimen		
Name	Ornamental Deciduous Trees																															
Amelanchier arborea • Downy Serviceberry	■			■				■	■		■		■	■						■								■		■	■	
Betula nigra 'Heritage' • Heritage River Birch	■			■						■				■	■				■	■											■	
Carpinus betulus • European Hornbeam	■		■							■	■		■	■	■			■	■							■	■		■			
Carpinus caroliniana • American Hornbeam	■		■							■	■	■	■		■				■	■						■	■		■			
Cercis canadensis • Eastern Redbud	■			■				■	■		■		■	■	■					■	■					■	■				■	
Chionanthus virginicus • White Fringetree	■		■					■	■		■			■	■			■	■							■	■				■	
Cornus florida 'Appalachian Spring' • Appalachian Spring Dogwood	■		■					■	■		■		■	■	■					■	■					■	■				■	
Crataegus viridis • Green Hawthorn	■			■				■	■				■	■						■	■					■	■		■		■	
Halesia carolina • Carolina Silverbell	■			■				■	■		■		■	■	■				■	■							■				■	
Hamamelis virginiana • Common Witchhazel	■			■		■			■	■		■	■	■						■	■					■	■		■		■	
Lagerstroemia indica • Common Crape Myrtle - various cultivars	■				■		■		■	■			■	■						■	■						■				■	
Magnolia stellata • Star Magnolia	■		■					■	■		■		■	■	■				■	■						■	■				■	
Magnolia virginiana • Sweetbay Magnolia	■			■				■	■		■	■		■					■	■						■	■				■	
Magnolia x soulangiana • Saucer Magnolia	■			■				■	■	■		■	■	■					■	■						■	■				■	
Oxydendrum arboreum • Sourwood	■		■			■		■	■	■		■	■	■							■					■	■				■	
Prunus serrulata 'Kwanzan' • Kwanzan Cherry	■			■				■	■		■		■		■					■	■						■				■	
Prunus x yedoensis • Yoshino Cherry	■			■				■	■		■		■		■					■	■						■				■	
Sassafras albidum • Common Sassafras	■			■				■	■		■		■	■	■				■	■							■				■	

Table B.3: Plant Selection List (continued)

Plant Material Suitability Matrix	Characteristics														Culture						Use										
	Type		Growth			Flower			Interest		Light			Salt Tolerant		Resistant		Soil Moisture		Function											
	Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/shade	Sun	Low	Medium	High	Drought / Pollution	Pest	Moist	Average	Dry	Street tree	Shade tree	Screen	Massing	Windbreak	Hedge	Bank cover	Specimen	
Name	Evergreen Trees																														
Ilex x attenuata 'Fosteri' • Foster's Holly		■	■					■	■				■	■			■	■		■						■	■	■	■		■
Ilex opaca • American Holly		■	■							■			■	■	■					■						■	■		■		■
Ilex x 'Nellie R. Stevens' • Nellie R. Stevens Holly		■			■					■			■	■				■		■	■					■	■	■	■		■
Juniperus virginiana • Eastern Red Cedar		■		■						■			■	■						■					■	■	■	■			
Magnolia grandiflora • Southern Magnolia		■	■					■		■		■	■	■				■		■					■						■
Deciduous Shrubs																															
Agarista populifolia • Florida Leucothoe	■				■			■	■			■	■					■		■	■						■	■	■		■
Ceanothus americanus • New Jersey Tea	■			■				■	■			■	■		■			■	■		■						■			■	
Clethra alnifolia • Summersweet Clethra	■		■					■	■			■	■			■		■	■		■						■	■	■		■
Cornus alba 'Ivory Halo' or 'Bailhalo' • Tatarian Dogwood	■		■			■		■	■			■	■	■				■	■		■						■	■	■		■
Cornus hessei 'Garden Glow' • Garden Glow Dogwood	■		■			■		■	■			■	■		■			■	■		■					■	■	■		■	
Cornus sanguinea 'Midwinter Fire' • Bloodtwig Dogwood	■		■			■		■	■			■	■		■			■	■		■						■	■	■		■
Cornus sericea 'Flaviramea' • Yellow Twig Dogwood	■		■					■	■	■		■	■		■			■	■		■					■	■	■		■	
Fothergilla gardenii • Dwarf Fothergilla	■		■					■	■			■	■		■			■	■		■					■	■	■		■	
Fothergilla major • Large Fothergilla	■		■					■	■	■		■	■	■				■	■		■					■	■	■		■	
Hydrangea aborescens 'Annabelle' • Annabelle Hydrangea	■			■				■	■			■	■		■			■	■		■					■	■	■		■	
Hydrangea quercifolia 'Snow Queen' • Oakleaf Hydrangea	■		■					■	■	■		■	■	■				■	■		■					■	■	■		■	
Ilex verticillata • Common Winterberry	■		■					■	■			■	■		■			■	■		■					■	■	■		■	
Itea virginica • Virginia Sweetspire	■		■					■	■	■		■	■	■				■	■		■					■	■	■		■	
Rhododendron periclymenoides • Pinxterbloom Azalea	■		■					■	■			■	■		■			■	■		■					■	■	■		■	
Rhus typhina • Staghorn Sumac	■			■					■	■		■	■	■				■	■		■					■	■	■		■	
Viburnum dentatum • Arrowwood Viburnum	■		■					■	■	■		■	■	■				■	■		■					■	■	■		■	
Viburnum prunifolium species or 'Summer Magic' • Summer Magic Viburnum	■		■					■	■	■		■	■	■				■	■		■					■	■	■		■	

Table B.3: Plant Selection List (continued)

Plant Material Suitability Matrix	Characteristics														Culture						Use									
	Type		Growth			Flower		Interest			Light			Salt Tolerant		Resistant		Soil Moisture		Function										
	Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/shade	Sun	Low	Medium	High	Drought / Pollution	Pest	Moist	Average	Dry	Street tree	Shade tree	Screen	Massing	Windbreak	Hedge	Bank cover	Specimen
Name	Evergreen Shrubs																													
Aucuba japonica 'Variegata nana' • Japanese Aucuba		■	■					■		■	■			■					■		■									■
Euonymus kiautschovicus 'Manhattan' • Spreading Euonymus		■			■					■				■	■				■		■				■	■			■	■
Ilex crenata • Japanese Holly - various cultivars		■	■							■				■	■				■		■									■
Ilex glabra • Inkberry		■	■				■			■				■	■					■		■								■
Kalmia latifolia • Mountain Laurel		■	■					■	■		■			■	■					■	■									■
Leiophyllum buxifolium • Box Sandmyrtle		■	■				■		■					■	■					■	■									■
Mahonia aquifolium • Oregon Hollygrape		■	■					■	■		■			■	■					■	■									■
Myrica pensylvanica • Northern Bayberry		■		■						■				■						■	■									■
Osmanthus heterophyllus • Holly osmanthus		■	■							■				■	■					■	■					■	■			■
Rhododendron species • Rhododendron		■	■					■	■		■			■	■					■	■									■
Rhododendron x 'P.J.M.' • P.J.M. Rhododendron		■	■					■	■					■	■					■	■									■
Groundcovers/Vines																														
Pachysandra procumbens • Alleghancy Pachysandra		■	■					■	■		■			■	■					■	■									■
Phlox stolonifera 'Sherwood Purple' • Creeping phlox		■		■				■	■					■	■					■	■									■
Herbaceous Plants																														
Achillea millefolium • Common Yarrow		■		■				■	■					■	■					■	■									■
Amsonia tabernaemontana 'Blue Ice' • Blue Star		■		■				■	■					■	■					■	■									■
Aquilegia canadensis • Columbine		■		■				■	■					■	■					■	■									■
Asclepias tuberosa • Butterfly Weed		■		■				■	■					■	■					■	■									■
Convallaria majalis • Lily-of-the-Valley		■		■				■	■		■			■	■					■	■									■
Echinacea purpurea 'Magnus' or 'White Swan' • Purple Coneflower		■		■				■	■					■	■					■	■									■
Eupatorium maculatum • Joe Pye Weed		■		■				■	■					■	■					■	■									■
Hemerocallis species • Daylily		■		■				■	■					■	■					■	■									■
Hosta species • Hosta		■		■				■	■		■			■	■					■	■									■
Monarda didyma • Scarlet Beebalm		■		■				■	■					■	■					■	■									■
Narcissus species • Daffodils		■		■				■	■					■	■					■	■									■
Rudbeckia fulgida 'Goldstrum' • Goldstrum Coneflower		■		■				■	■					■	■					■	■									■
Symphotrichum novae-angliae • New England Aster		■		■				■	■					■	■					■	■									■
Turf Grasses																														
Festuca arundinacea • Tall Fescue		■		■						■				■	■					■	■									■
Festuca rubra • Red Fescue		■		■						■				■	■					■	■									■
Lolium perenne • Ryegrass		■		■						■				■	■					■	■									■

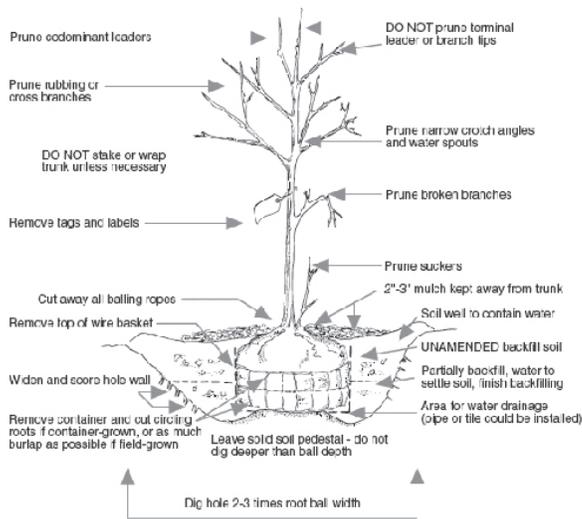


Figure B.1: Planting details for deciduous trees

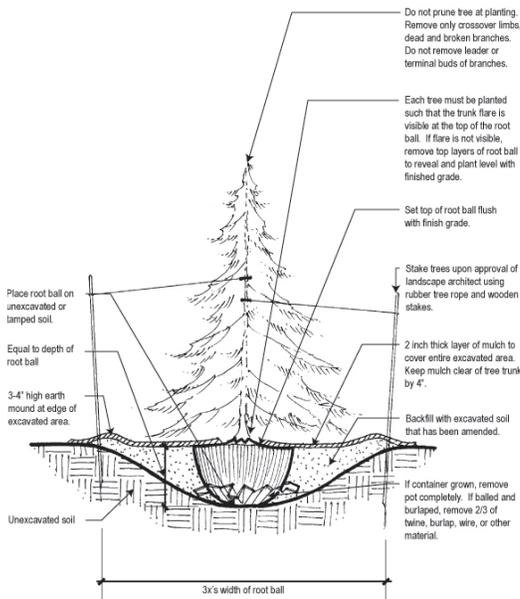


Figure B.2: Planting details for evergreen trees

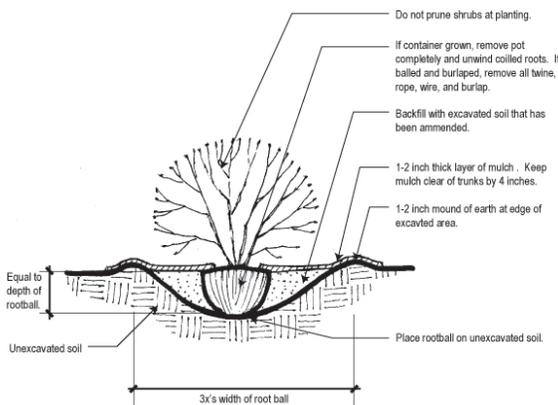


Figure B.3: Shrub planting details

Plant Material Installation

A key step in assuring successful planting is to select plants of the highest quality. Plant material shall 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.

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 then verify with the DPW.

The planting and establishment of trees, shrubs, groundcovers, and vines is detailed in TM 5-803-13, Chapter 3. 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. General guidelines for plant installation are:

- Thin plants at planting time by removing one-third of the vegetative material.
- Spray all evergreens with an antidesiccant within 24 hours of planting.
- Water all plants thoroughly during the first 24-hour period after planting.
- Site all plants and stakes plumb.
- Space plants according to their mature size.
- Install plant materials in groups for greater impact.
- Follow installation policy of planting two trees for every one 4" in diameter at breast height removed on new construction projects, to help maintain Fort Belvoir as a "Beautiful to See" installation. New trees must have a minimum 2.5"-caliper diameter above the root flare.

Maintenance of Plant Material

The ease of maintenance shall be one of the primary goals when considering the success of any planting design.

Pruning

In general, plant material shall be allowed to conform to its natural shape (Figure B.4). This practice allows the plant to mature in a healthy 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. Guidelines include:

Pruning Shrubs

- Do not prune shrubs flat across the top.
- Annually prune branches on thick-branched shrubs, and do so at its base.
- Prune deciduous shrub stems as close to the ground as possible and shrub branches as close to the stem as possible.
- Prune about one-third of all branches when “thinning out” deciduous shrubs, and cut where they meet their main stem.

Pruning Trees

- Remove a large limb by making three cuts as indicated in Figure B.5.
- Make the first cut, which is a partial cut, on the underside of the branch (located 12-24” from the main trunk or branch).
- Make the second cut, which is a partial cut, on the top side of the branch, but located farther out and within 6” of the first cut. (These first two cuts are made to remove the weight of the branch, ensuring bark does not rip during the third cut.)
- Make the third, final, and complete cut just beyond the outer portion of the branch collar.
- Never cut the central leader of the tree.
- Prune coniferous evergreen trees during the spring, by snipping off new growth. Avoid pruning plant material into geometric shapes, unless a symmetrical topiary appearance is desired.

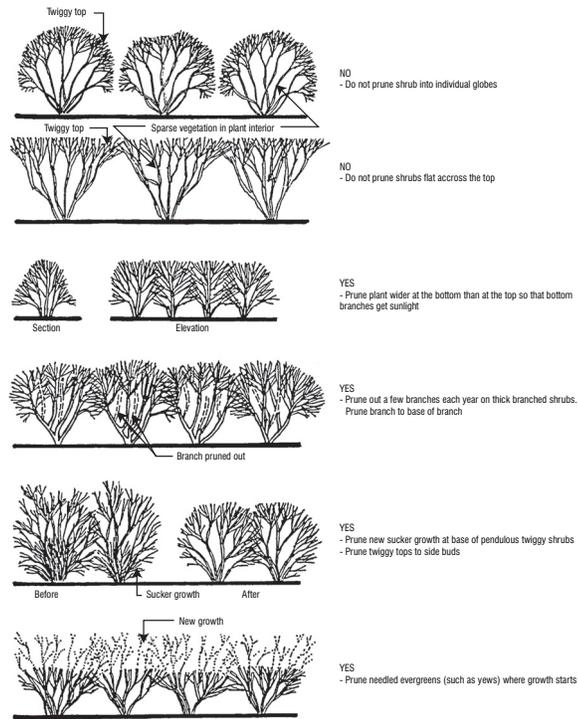


Figure B.4: Shrub pruning detail

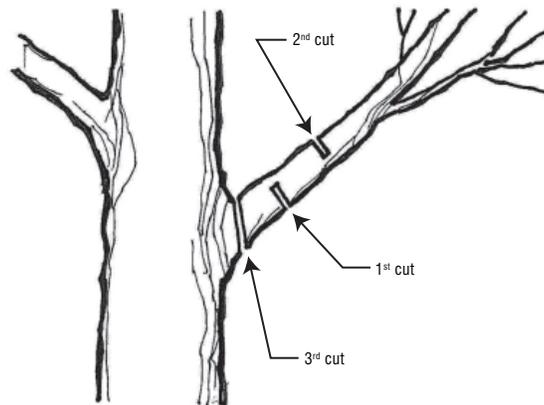


Figure B.5: Tree pruning diagram

Mulching

Mulching planting beds reduces maintenance, improves health of the plants, enhances the landscape's appearance, and provides continuity to the landscape design.

Guidelines include:

- Use mulch around the base of plant material to provide for greater moisture and help inhibit the growth of weeds and grasses. Mulch shall be maintained at a depth of 2-4 inches.
- The best time to mulch for water conservation is in the late spring. Apply mulch within 24 hours to new plantings.
- The mulch shall be a 50/50 mix of shredded hardwood mulch and leaf compost.
- Mulch can be obtained from the Fort Belvoir Recycling Center (depending on product availability).



Mulching not only improves soil condition and retains moisture, but reduces maintenance requirements.

Groundcover Maintenance

Although groundcovers do not require pruning, they may be periodically dug up in the spring or fall for propagation and to prevent overcrowding in their beds.

Natural Landscapes

Previous landscape design examples focused on “maintained” landscapes. This section provides guidance for the “natural” landscapes on Fort Belvoir, including woodlands, forested wetlands, and natural open spaces. While these native vegetation stands are typically not referred to as “maintained,” continued maintenance is required to sustain the health of these areas. It often involves close coordination and cooperation among facilities on Fort Belvoir, regulatory agencies, and surrounding communities to maintain and preserve these natural landscapes. Some of the broader regional environmental laws and regulations that affect design and development on Fort Belvoir include:

- The Chesapeake Bay Preservation Act, RPAs.
- Resource Management Areas (RMA) along Fort Belvoir watersheds.
- The Forest and Wildlife Corridor, which preserves biodiversity within wildlife and wetland refuges on and next to the Post.
- Clean Water Act of 1987.
- Virginia Non-point Source Pollution (NPS) Management Program.
- Consulting with the USACE, pursuant to Section 404 of the Clean Water Act when dredging and filling in wetlands.
- Virginia Erosion and Sediment Control Law and Regulations (VESCL and VESCR).
- Fort Belvoir’s Forest Management Plan (FMP).

Forested Wetlands

Protection of wetlands is critical to the maintenance and management of wildlife habitat areas on Post, as well as the Chesapeake Bay ecosystem as a whole. In general, all future development on Fort Belvoir must be consistent with the provisions of the previously mentioned laws and regulations.

Forested wetlands fall into three main categories: bottomland hardwoods, riparian forests, and emergent wetlands. Bottomland hardwood forests are found in the floodplains of Accotink and Dogue Creeks. Riparian forests occur along the upland drainage system, but are not structurally distinguishable from the more basic upland hardwoods surrounding them. Emergent wetlands include both wet meadows and tidal-freshwater marshes. These are primarily distributed at the mouths of the three major creeks. Management practices shall help maintain wetlands by:

- Limiting runoff to predevelopment levels at major building construction sites and large parking lots.
- Designing and constructing stormwater detention basins as part of overall project design.

- Exploring opportunities for new wetland creation during design of stormwater detention basins.
- Assessing and remediating surface and subsurface water pollution.
- Implementing practices to reduce future discharges of pollutants into local waters.
- Protecting wetlands and other tributaries of the Potomac River, as well as adjacent buffers and steep slopes, as regulated by RPAs and RMAs under the Virginia Chesapeake Bay Preservation Act.
- Minimizing development and de-vegetation of steep slopes that are susceptible to erosion once exposed.
- Using plant material that exists in the native wetland environment.
- Promoting the existence of aquatic or hydroponic habitat.
- Fortifying the water edge with plant material that deters erosion and filters sediment/contaminants.

Woodlands

Fort Belvoir woodlands include naturally vegetated areas between development zones and forests. These are primarily located on North Post, western portions of South Post, and Southwest Post. The woodlands are managed under Fort Belvoir’s FMP. The FMP states:

- Preserve woodlands on Post as a critical element to preserve the natural habitat and enhance the overall quality of life at Fort Belvoir.
- Maintain multiple uses of the forest that support the military mission, and preserve wildlife habitat.
- Enhance the quality of the environment.
- Protect recreation, wildlife, and watershed resources, while sustaining the yield and profit of harvested timber.
- Protect wildlife habitat, while maximizing the standing timber resources.
- Manage activities of forest protection, harvesting, reforestation, and timber stand improvement. (Reforestation efforts on Post have resulted in the planting of 20,000 to 25,000 trees between 2010 and 2012.)
- Implement woodland edge planting as part of the reforestation program. This method provides significant wildlife habitat, wildlife food, and escape routes for wildlife.
- Plant trees and shrubs along the sides of stream channels to reduce erosion and siltation, as well as to provide shade for maintaining moderate water temperatures.
- Continue erosion control, Post beautification, and wildlife habitat improvements, as directed by the FMP.
- Preserve woodland areas as part of an overall scheme for landscape treatments on the Post.
- Continue land management practices provided by Fort Belvoir’s natural resource managers by abiding to the resource management plan.



Natural Open Space

Natural Open Space

Natural open spaces are woodlands located on steep slopes, usually within stream valleys associated with wetlands. Most of the natural open space at Fort Belvoir was not developed, due to regulatory action or the construction limitations of the terrain. As a result, these areas have remained relatively untouched and provide natural buffers and wildlife habitat. Typically, natural open spaces are situated between housing subdivisions on South Post, near Woodlawn Village and River Village. Landscaping of these areas shall include:

- Native plant materials to supplement open space use as a screen/buffer.
- Refortification of the forests and woodlands, according to the Post's Resource Management Plan and the FMP.
- Preservation of open space as wildlife habitat.
- Utilization for recreational purposes.

Streams and Wetlands

On the lands owned by Fort Belvoir there are many tidal and nontidal streams and wetlands that may affect the design of a given project. Tidal and nontidal streams and wetlands are regulated under the Rivers and Harbors Act of 1899, Sections 401 and 404 of the federal Clean Water Act and under the Virginia Water Protection Permit Program and the Virginia Wetlands Act by the State of Virginia. Tidal water bodies and perennial streams that have a drainage area of more than five square miles or a mean annual flow of more than five cubic feet/second, such as the Accotink Creek are also regulated by the Virginia Marine Resources Commission. Fort Belvoir is also located within the Chesapeake Bay Watershed. Under Virginia's Chesapeake Bay Preservation Act and associated Chesapeake Bay Preservation Area Designation and Management Regulations, tidal wetlands and streams are afforded a 100 foot buffer identified as the Resource Protection Area which can affect the amount of impervious surfaces allowed on a given project site.

When planning a project the first step shall be to complete a site inventory to determine if streams and/or wetlands are present on the site. To obtain general site information and maps the project proponent can contact the Fort Belvoir DPW, ENRD for assistance with the identification and/or delineation of streams and wetlands previously identified and/or delineated and they can contact the DPW GIS office for mapping information.

If streams and wetlands are present on the project site, limiting site development to avoid these areas is always the best solution from the perspective of time and costs. If impacts to streams and/or wetlands cannot be avoided, the stream and wetland boundaries must be surveyed by a licensed surveyor and the surveyed boundaries will have to be shown on all project construction plans; it will be the responsibility of the project proponent to delineate and survey all stream and wetland boundaries and to have these areas incorporated into the project design plans. After the delineation and survey work has been completed and prior to beginning the permit process, the project proponent will have to contact Fort Belvoir ENRD which will apply for a Jurisdictional Determination (JD) from the U.S. Army Corps of Engineers, Baltimore District; JD's are valid for a period of five years.

The next step for the project proponent will be for them to contact the Fort Belvoir's Wetland Habitat Program Manager in the DPW ENRD to begin the permit process. The permit application will require documentation of compliance with the 404(b)(1) guidelines and will also require the preparation of an avoidance and minimization analysis to justify the proposed impacts. The ENRD obtains the permits for the Installation Commander. The project proponent is responsible for all permitting costs.

The final part of the permit process is for the project proponent to secure mitigation to offset the unavoidable impacts to streams and/or wetlands. The project proponent is responsible for all of the costs associated with securing mitigation.

Depending on the location of the site, endangered and threatened species surveys may be required as part of the permit application or a Biological Assessment might need to be prepared. If such species do exist, ENRD will coordinate with the regulatory agencies to obtain the required threatened and endangered species approvals for the project. The project proponent is responsible for all cost associated with the survey work and any required documentation.

Outdoor Lighting Guidelines

The following guidelines were extracted from the Fairfax County Outdoor Lighting Standards which became effective September 2003. Additional guidance specific to Fort Belvoir has also been added to assist designers in lighting requirements for the Installation. For more information or guidance for these standards, please refer to the Fairfax County zoning ordinances.



Figure B.6: Lighting used for architecture/landscaping

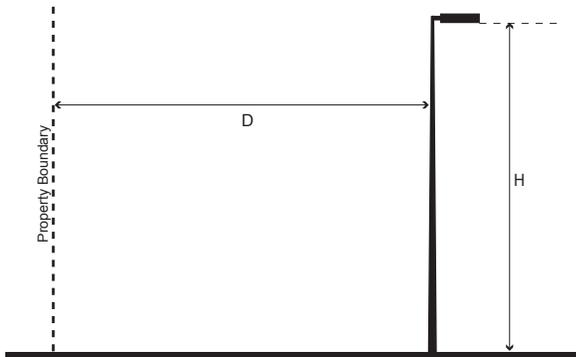


Figure B.7: Setback or Shielding of outdoor lighting fixtures

$$HEIGHT \leq 3 + (D/3)$$

Where *D* = Distance in feet from light source to the nearest residential, historic or off-Post property line (extended vertically). Additional "house-side shielding" shall be added in all cases where height > 3 + (*D*/3)

Applicability

These outdoor lighting provisions apply to the installation of new outdoor lighting fixtures or the replacement of existing outdoor lighting fixtures. Replacement of a lighting fixture is defined as a change of fixture type, or change to the mounting height or location of the fixture. Routine lighting fixture maintenance, such as changing lamps or light bulbs, ballast, starter, photo control, housing, lenses and other similar components, does not constitute replacement and is allowed provided such changes do not result in a higher light output.

General Provisions

- **Full Cut-Off Lighting Fixtures:** Full cut-off lighting fixtures are required for all outdoor walkway, parking lot, canopy and building/wall-mounted lighting, and all lighting fixtures located within those portions of open-sided parking structures that are aboveground. An open-sided parking structure is a parking structure which contains exterior walls that are not fully enclosed between the floor and ceiling. Cut-off classifications are further explained in Chapter 6.
- **Roof and Canopy Lighting:** Outdoor lighting fixtures that are enclosed in clear, white, off-white or yellow casing are not allowed on the roofs of buildings or on the sides of canopies. Internally illuminated signs are an exception to this rule and are discussed in Chapter 6.
- **Architectural and Landscaping Lighting:** Outdoor lighting used to illuminate flags, statues, signs or other objects mounted on a pole, pedestal or platform, spotlighting or floodlighting used for architectural or landscape purposes, must use full cut-off or directionally shielded lighting fixtures that are aimed and controlled so that the directed light is substantially confined to the object intended to be illuminated. Figure B.6 shows how directionally shielded lighting fixtures may be used for architectural and landscaping purposes.
- **Setback or Shielding Requirement:** On lots which abut property that is residentially zoned and developed, vacant, homeowners' association open space, or historic, all outdoor lighting fixtures must be set back a minimum prescribed distance from the nearest residential lot line, or "house-side shielding" must be used on the residential property side of the lighting fixture as indicated in Figure B.7. A house-side shield typically consists of a visor or shielding panel that attaches to a lighting fixture. This provision is applicable for both light poles and lighting fixtures mounted on the side and/or top of a building or structure.

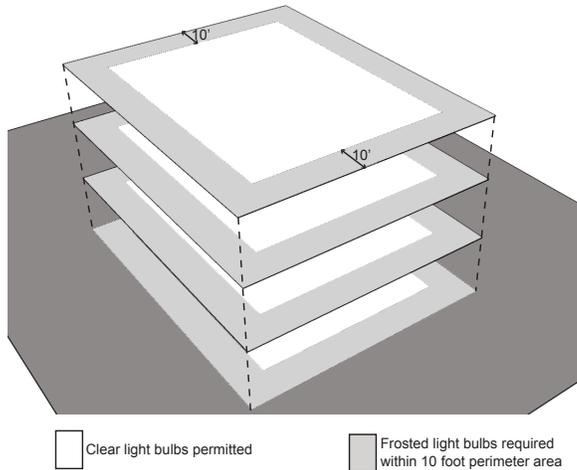


Figure B.8: Light bulb types that are permitted during building construction.

- **Disability Glare:** All outdoor lighting fixtures must be aimed, located and maintained to prevent disability glare, which is a form of glare that causes reduced visibility and visual performance.
- **Parking Lot Lighting Curfews:** On all nonresidential lots which contain a minimum of 4 parking lot light poles, parking lot lighting levels for ground surface parking lots and the top levels of parking decks or structures must be reduced by at least 50 percent of full operational levels within 30 minutes after the close of business. Given that a certain minimum lighting level is recommended for safety and security purposes, this provision does not require parking lot lighting levels to be reduced to less than 0.2 footcandles as measured horizontally at the surface on which the light pole is mounted.
- **Construction Lighting:** All construction site lighting fixtures must be full cut-off or directional-shielded fixtures that are aimed and controlled so the directed light is substantially confined to the object intended to be illuminated. Frosted light bulbs must be used to light the 10 foot outermost perimeter area of the interiors of the buildings under construction which contain 5 or more stories. A building is no longer considered under construction once exterior walls and windows are installed and permanent lighting replaces temporary lighting as the primary source of light for the building. Figure B.8 depicts where frosted light bulbs are required.
- **High Intensity Light Beams:** Outdoor searchlights, lasers or strobe lights are prohibited.
- All lighting shall be designed and located to prevent undesirable spillover of light into other areas and glare. All light fixtures shall be aimed or screened to prevent disability glare on motorists, discomfort glare on pedestrians and light infiltration into residences and buildings. Additional measures may need to be taken to restrict light from infiltrating historic properties that include, but are not limited to, Woodlawn Plantation, Friends Meeting House, Pohick Church, and the Woodlawn National Register-eligible historic district. With relation to historic resources adjacent to the Post, Fort Belvoir aims to follow the Fairfax County Outdoor Lighting Standards as best a possible.
- Outdoor light fixtures proposed for the historic district and adjacent to the historic district shall match the historic lamp and post found in Tables 6.2 and 6.3 of Chapter 6 of this IPS.

Service Station Canopy and Retail Sales Area Lighting

In addition to the previously listed general provisions, outdoor lighting fixtures associated with service stations, service station/mini-marts, retail, and ancillary service establishments are subject to the following:

- **Maximum Lighting Levels** - Service station/shoppette canopy lighting and outdoor display area lighting used in conjunction with retail and other ancillary service establishments must not exceed a maintained lighting level of 30 footcandles as measured horizontally at grade. Higher levels, up to 50 footcandles, or lower levels, less than 30 footcandles, may be approved by the DPW in conjunction with the approval of a special exception.
- **A Photometric Plan** is required and must be submitted as part of a site plan submission, or as a separate submission, when one of the above is not also required for a service station, service station/shoppette, retail or other ancillary service establishment. A photometric plan must contain the following information:
 - Location and limits of the canopy or outdoor display area.
 - Location and height of all canopy lighting for service stations and all pole, building or ground-mounted lighting fixtures for outdoor display areas of vehicle sale, rental and ancillary service establishments.
 - A photometric diagram showing predicted maintained lighting levels of the proposed lighting fixtures. (Photometric Plan shall be submitted to DPW for review and final approval.)

- Boundaries, dimensions and total land area of the outdoor recreation/sports facility property.
- Location and limits of playing field/courts, to include perimeter areas. The required perimeter areas for baseball/softball fields is 30 feet. Rectangular playing fields extend 30 feet beyond the ends and 20 feet from the sidelines. The perimeter playing area for all other playing/field courts extends 10 feet beyond the playing field boundary.
- Location, height and illustration of each style of all pole, building and ground mounted lighting fixtures for the playing/field court.
- A photometric diagram showing predicted maintained lighting levels for the proposed playing field/court and associated perimeter area lighting, not to exceed the levels permitted under Table IV in Part 9 of Article 14 of the Zoning Ordinance (see Table B.4).

- **Maximum Lighting Levels** - The lighting for playing field/courts and associated perimeter areas must meet the maximum footcandles indicated for the specific uses in the Zoning Ordinance. Footcandle measurements must be measured horizontally three feet above grade level and represent maintained lighting levels.
- **Type of Lighting Fixtures** - All playing field/court lighting fixtures must either be full cut-off or directionally shielded lighting fixtures.
- **Curfews** - Generally, the use of playing field/court lighting is not permitted between 11:00 PM and 7:00 AM.

Outdoor Recreation/Sports Facility Lighting

When an outdoor recreation/sports facility has lighted playing fields/courts that, individually or cumulatively, exceed 10,000 square feet in area, and/or have associated light poles that exceed 20 feet in height, the playing fields/courts are subject to the provisions listed below.

- **A Sports Illumination Plan** must be submitted as part of a special exception, as part of a site plan submission, or as a separate submission when one of the above is not also required for an outdoor recreation/sports facility. A sports illumination plan must contain the following information:

Table B.4: Outdoor Recreation/Sports Facility Lighting		
Recreation/Sport Facility Use	Specific Lighted Area	Footcandles*
Archery Ranges		10
Baseball/Softball	Infield	60
	Outfield	40
Baseball (Professional)	Infield	150
	Outfield	100
Baseball Hitting Ranges		50
Basketball, Volleyball		30
Field Hockey, Football, Soccer, Lacrosse, Track & Field		50
Go-Cart Track		30
Golf Courses	Tee Boxes, Frees	5
	Fairways	3
Golf Driving Ranges	Tee Box	20
	Fairways	3
	Greens	5
Golf (Miniature)		20
Horse Riding Rings/Show Areas		30
Ice Skating, Ice Hockey, Roller Skating Rinks		50
Swimming Pools	Pool Surface	10
	Pool Deck	30
Tennis Courts (College/High School)		60
Tennis Courts (Recreational)		40

Exemptions

The following are exempt from the previously mentioned outdoor lighting provisions, provided that such fixtures, except for those set forth in the first two bullets, do not cause disability glare:

- Lighting fixtures and standards required by federal, DoD, state or county agencies, including street lights within the public right-of-way.
- Outdoor lighting fixtures used by DoD, law enforcement, fire and rescue, the Virginia Department of Transportation or other emergency response agencies to perform security, safety emergency or construction repair work, or to perform nighttime road construction on major thoroughfares.
- Holiday lighting fixtures.
- Motion-activated light fixtures as follows:
 - On lots developed with single family dwellings when such lighting fixtures emit initial lighting levels of 6000 lumens or less, are extinguished within 5 minutes upon cessation of motion and are aimed such that the lamp or light bulb portion of the lighting fixture is not directly visible at 5 feet above the property boundary.
 - On all other lots when such lighting fixtures are aimed such that the lamp or light bulb portion of the lighting fixture is not directly visible at 5 feet above the property line.
- On lots developed with single family dwellings, outdoor lighting fixtures with initial light outputs of 2000 lumens or less are not subject to the outdoor lighting general provisions. A 2000 lumen output is the approximate light level produced with a 100 watt incandescent light bulb.
- When function, historic compliance, design compatibility, and/or fixture deficiencies prevent the use of full-cutoff, the next lesser cutoff classification is permitted.

Light Pole Height

Height - Light pole height is measured from the grade or surface on which the light pole is mounted to the bottom of the lighting fixture and is limited as follows:

- Light poles on outdoor recreation/sports facilities - No maximum height restriction, but light pole heights must be shown on a sports illumination plan.
- Light poles on top of parking decks or structures - Maximum height of 20 feet.
- All other light poles - Maximum height of 40 feet.

The maximum allowable light pole heights are illustrated in Figure B.9.

Required Site Plan Information

The following outdoor lighting information must be included with all site plan submissions:

- The location and height of all light poles, including parking lot and walkway light poles
- Illustrations of each style of freestanding lighting fixture that show that the fixture cutoff classification and/or directionally shielded lighting fixture, and
- A statement from the owner/developer certifying that all required outdoor lighting provisions will be met.

Grandfather Provisions

The following are grandfathered from the outdoor lighting provisions:

- Special permit, special exceptions, or developments plans accepted prior to September 30, 2008 that contain specific conditions that conflict with these outdoor lighting provisions.
- Building and site plans submitted on or before September 30, 2008, provided such plans are (a) approved within 12 months of the return of the initial submission to the applicant or agent, (b) the plan remains valid, (c) a building permit(s) for the structure(s) shown on the approved plan is issued, and (d) the structures and uses are constructed in accordance with such building permit.

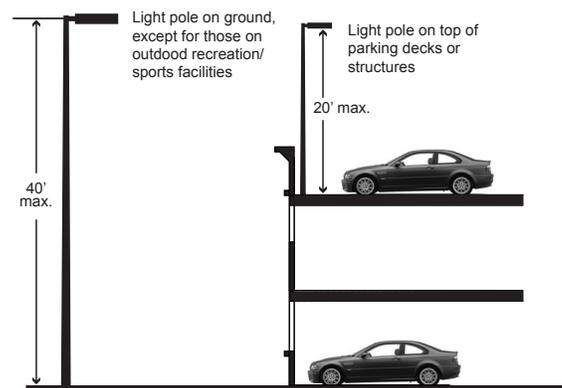


Figure B.9: Maximum allowable light pole heights

Force Protection

Operational, logistical, and security requirements must be integrated into the overall design of buildings, equipment, landscaping, parking, roads, and other associated features of a development site. Standards associated with force protection and site planning are established to address vehicle borne and hand placed explosive threats. The most cost-effective solution for mitigating explosive effects on buildings is to keep explosives as far as possible from them. Standoff distances must be coupled with appropriate building hardening to provide the necessary level of protection to DoD personnel as described in the following section, tables and figures.

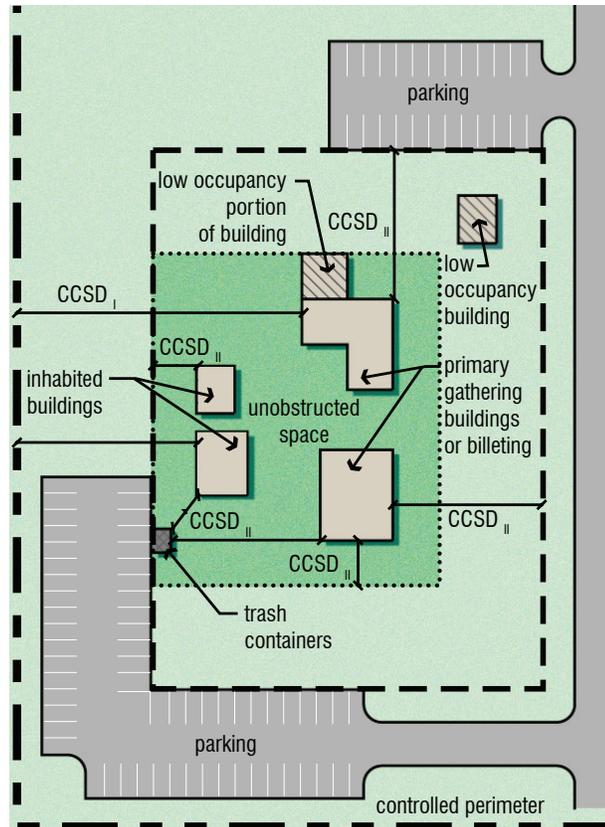
Final design decisions to meet security and anti-terrorism requirements and to resolve conflicts will require coordination among the design disciplines and appropriate functional areas. This includes land planners, landscape architects, intelligence personnel, security personnel, Force Protection Officer, physical security, 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 ADAAG, the 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.

The following standards detail standoff distances, referred to as “conventional construction standoff distances” (CCSD), that when achieved will allow for buildings to be built with minimal additional construction costs for blast protection. Where conventional construction standoff distances detailed cannot be achieved because land is unavailable, these AT/FP standards allow for building hardening to mitigate the blast effects.

The standoff distances apply to all new and existing (when triggered) DoD buildings required to comply with UFC 4-010-01. They address standoff distances to controlled perimeters, parking areas, roadways, and trash containers. The standoff distances are presented in Figures B.7 and B.8 and Tables B.5 and B.6. Where the standoff distances in the CCSDs can be met, conventional construction for the applicable building walls may be used for the building without a specific analysis of blast effects. Windows and doors must be designed for the applicable standoff distances. Where CCSDs are not available, lesser standoff distances may be validated through analysis that verifies the applicable level of protection is met, but none may be closer than the minimum standoff distances except for the following buildings:

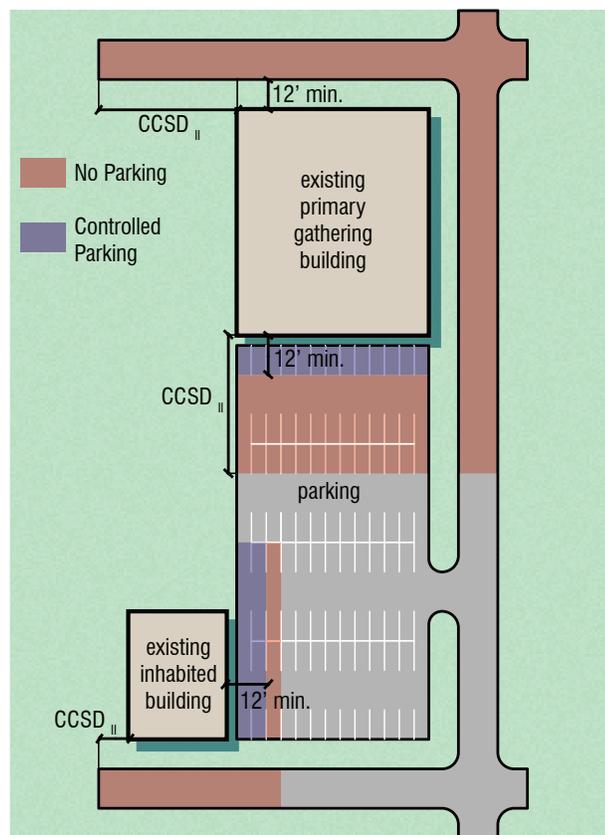
- Low-occupancy buildings

Figure B.10: Anti-Terrorism/Force Protection - Standoff Distances



Note: CCSD = Conventional Construction Standoff Distance from Table B.6

Figure B.11: Parking and Roadway Control for Existing Buildings



Note: CCSD = Conventional Construction Standoff Distance from Table B.6.

- Low-occupancy family housing (12 units or fewer per building)
- Fisher Houses (24 units or fewer)
- Town Centers
- Enhanced use leases
- Transitional structures and spaces (Five years or less)
- Temporary and relocatable buildings (Five years or less)
- Construction administration structures
- Recruiting stations in leased spaces
- Stand-alone gas stations and car care centers
- Military protective construction
- Stand-alone franchised fast food operations
- Stand-alone shoppettes, mini marts, and similarly sized commissaries
- Small stand-alone commercial, bank, and pharmacy facilities

For further guidance on AT/FP setbacks refer to UFC 4-010-01 DoD Minimum Anti-terrorism Standards for Buildings.

Table B.5: Standoff Distances for New and Existing Buildings

Distance to:	Building Category	Standoff Distances				
		Applicable Level of Protection	Conventional Construction Standoff Distance		Minimum Standoff Distance ²	Applicable Explosive Weight ³
			Load Bearing Walls ¹	Non-Load Bearing Walls ¹		
Controlled Perimeter or Parking and Roadways without a Controlled Perimeter	Billeting and High-Occupancy Family Housing	Low	A	C	18 ft (5.5 m)	I
	Primary Gathering Building	Low	A	C	18 ft (5.5 m)	I
	Inhabited Building	Very Low	B	D	18 ft (5.5 m)	I
Parking and Roadways within a Controlled Perimeter	Billeting and High-Occupancy Family Housing	Low	E	G	12 ft (3.6 m)	II
	Primary Gathering Building	Low	E	G	12 ft (3.6 m)	II
	Inhabited Building	Very Low	F	H	12 ft (3.6 m)	II
Trash Containers	Billeting and High-Occupancy Family Housing	Low	E	G	12 ft (3.6 m)	II
	Primary Gathering Building	Low	E	G	12 ft (3.6 m)	II
	Inhabited Building	Very Low	F	H	12 ft (3.6 m)	II

1. See Table B.6 for standoff distances associated with conventional construction.

2. For new construction, standoff distances less than those in this column are not allowed for new buildings regardless of analysis or hardening. For existing buildings that are constructed/retrofitted to provide the required level of protection, standoffs less than those in this column are allowed, but discouraged.

3. See UFC 4-010-02 for the specific explosive weights (pounds per kilogram of TNT) associated with designations I and II. UFC 4-010-02 is for official use only.

Source: UFC 4-010-01, 9 February 2012.

Table B.6: Conventional Construction Standoff Distances

Wall Type	Column Letter							
	A	B	C	D	E	F	G	H
Wood Studs - Brick Veneer	105 ft (32 m)	105 ft (32 m)	79 ft (24 m)	66 ft (20 m)	36 ft (11 m)	36 ft (11 m)	23 ft (7 m)	16 ft (5 m)
Wood Studs - Exterior Insulation and Finish Systems (EIFS)	207 ft (63 m)	207 ft (63 m)	164 ft (50 m)	141 ft (43 m)	85 ft (26 m)	85 ft (26 m)	66 ft (20 m)	56 ft (17 m)
Metal Studs - Brick Veneer	187 ft (57 m)	108 ft (33 m)	207 ft ² (63 m)	186 ft ² (57 m)	75 ft (23 m)	43 ft (13 m)	82 ft ² (25 m)	75 ft ² (23 m)
Metal Studs - EIFS	361 ft (110 m)	207 ft (63 m)	420 ft ² (128 m)	361 ft ² (110 m)	151 ft (46 m)	85 ft (26 m)	167 ft ² (51 m)	151 ft ² (46 m)
Metal Panels	n/a ¹	n/a ¹	151 ft (46 m)	108 ft (33 m)	n/a ¹	n/a ¹	56 ft (17 m)	39 ft (12 m)
Girts	n/a ¹	n/a ¹	115 ft (35 m)	59 ft (18 m)	n/a ¹	n/a ¹	23 ft (7 m)	16 ft (5 m)
Reinforced Concrete	66 ft (20 m)	66 ft (20 m)	26 ft (8 m)	20 ft (6 m)	16 ft (5 m)	16 ft (5 m)	13 ft (4 m)	13 ft (4 m)
Unreinforced Masonry ³	262 ft (80 m)	262 ft (80 m)	125 ft (38 m)	33 ft (10 m)	80 ft (24 m)	80 ft (24 m)	26 ft (8 m)	16 ft (5 m)
Reinforced Masonry	86 ft (26 m)	86 ft (26 m)	30 ft (9 m)	20 ft (6 m)	30 ft (9 m)	30 ft (9 m)	13 ft (4 m)	13 ft (4 m)
European Block	164 ft (50 m)	164 ft (50 m)	59 ft (18 m)	30 ft (9 m)	39 ft (12 m)	39 ft (12 m)	23 ft (7 m)	16 ft (5 m)

1. Metal panels and girts are not considered primary structural members.

2. Non-load bearing steel studs are assumed to have slip-track connections. Closer distances may be obtained through non-standard detailing and analysis.

3. Only used for analysis of existing structures. Not allowed for new construction.

Source: UFC 4-010-01, 9 February 2012.

Standards and References

Standards and References for the Army Installation Planning Standards (IPS) that apply to each Chapter are listed below.

Chapter 2, Site Planning Design Standards

- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- 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
- Master Planning Instructions (MPI)
- Technical Instructions (TI) 800-01, Design Criteria
- Technical Instructions (TI) 801-02, Family Housing
- 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
- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chapter 7
- Uniform Federal Accessibility Standards (UFAS)
- Whole Building Design

Chapter 3, Building Design Standards

- Air Force Sustainable Facilities Guide
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- AR 140-483, Army Reserve Land and Facilities Management
- 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 350-19, The Army Sustainable Range Program
- AR 405-45, Real Property Inventory Management
- AR 405-70, Utilization of Real Property
- AR 420-70, Buildings and Structures
- Army Barracks Master Plan
- Army Brand Theme Operations
- Army Chapel Standard Definitive Design
- Army Knowledge Online
- Army Lodging Standards
- Army Standard for Chapel Construction – January 2004 and Memorandum for Record, subject: The Army Standards for Chapels, dated 21 January 2004.
- Army Standards for Child Development Center Construction (for school-age children) October 2004
- Army Standards for Company Operations Facilities (COFs)
- Army Standards for General Instruction Building (GIB) and Army Continuing Education System (ACES) Standards
- Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website
- DA Pam 200-4, Cultural Resources Management
- Design Manual for Remote Target Systems (RETS) Ranges, CEHCN 1110-1-23 Manual
- Engineering and Construction Bulletins
- Engineering Knowledge On-line (EKO) Sustainable Design and Development
- ER 1110-345-122, Engineering and Design, Interior Design



- General Instruction Building (GIB) and Army Continuing Education System (ACES) Standard Design Criteria Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003
- NG Pam 415-12, Army National Guard Facilities Allowances
- Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA (FM&C) Sales and Outlease of Army Assets - Installation Guide
- Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing
- Revised Range Design/Construction Interface Standards
- Secretary of the Interior's Standards for the Treatment of Historic Properties
- Standards of Seismic Safety for Existing Federally Owned and Leased Buildings
- TC 25-8, Training Ranges
- Technical Guide for Installation Information Infrastructure Architecture (I3A). Available through Army Knowledge Online (AKO). Search for "I3A".
- Technical Instructions (TI) 800-01, Design Criteria
- Technical Instructions (TI) 811-16, Lighting Design
- Technical Manual (TM) 5-807-10, Signage
- Technical Manual (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
- Technical Manual (TM) 5-683, Electrical Interior Facilities
- Technical Manual (TM) 5-688, Foreign Voltage and Frequencies Guide
- Technical Manual (TM) 5-809-10/Navy NAVFAC P-355/Air Force AFM 88-3, Chap 13, Seismic Design for Buildings
- The Army Standard for Access Control Points (ACPs)
- The Army Standards for Electronic Key Card Access for all Facilities
- U.S. Army Corps of Engineers Engineering Technical Letter (ETL) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide
- U.S. Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website
- UFC 1-200-01, Design: General Building Requirements
- UFC 1-300-05A, Installation Support
- UFC 1-300-05A, Installation Support
- UFC 2-130-07, Arctic and Subarctic Construction - Buildings
- UFC 2-600-01, Installation Design, Chapter 8
- UFC 3-120-02AN, Design Guide: Interiors
- UFC 3-301-05A, Design: Seismic Evaluation and Rehabilitation for Buildings
- UFC 3-310-03A, Design: Seismic Design for Buildings
- UFC 3-400-01, Design: Energy Conservation
- UFC 3-600-01, Design: Fire Protection Engineering for Facilities
- 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
- UFC 4-510-01, Design: Medical Military Facilities
- UFGS 099000, Paints and Coatings
- Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHNC 1110-1-23 Manual
- Uniform Federal Accessibility Standards (UFAS)
- Whole Building Design Guide

Chapter 4, Circulation Design Standards

- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Army Regulation (AR) 420-72, Transportation Infrastructure and Dams
- Chicago's Bike Lane Design Manual (Provides a comprehensive series of technical drawings and design specifications for bike lanes.)
- Federal Highway Administration reference document "Accessible Sidewalks and Street Crossings – an informational guide".
- Illumination Engineering Society of North America (IESNA)
- Manual For Railway Engineering
- Manual of Uniform Traffic Control Devices (MUTCD)
- Technical Manual (TM) 5-811-1/Air Force AFJMAN 32-1080, Electric Power Supply and Distribution
- Technical Manual (TM) 5-850-2/Air Force AFJMAN 32-1046, Railroad Design and Rehabilitation
- 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, as well as curvature data.)
- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chapter 9
- 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) 3-250-01FA, Design: Pavement 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) 3-260-02, Design: Pavement Design for Airfields
- Unified Facilities Criteria (UFC) 3-550-03FA, Design: Electric Power Supply and Distribution
- Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Anti-terrorism Standards for Buildings
- Unified Facilities Criteria (UFC) 4-860-01FA, Design: Railroad Design and Rehabilitation
- Uniform Federal Accessibility Standards (UFAS)

Chapter 5, Landscape Design Standards

- American Standard for Nursery Stock, ANSI Z60.1
- Army Regulation (AR) 420-70, Buildings and Structures
- Overseas (Host Nation Standards)
- Technical Manual (TM) 5-630, Natural Resources Land Management
- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chapter 10
- Unified Facilities Criteria (UFC) 3-210-05FA, Design: Landscape Design and Planting Criteria
- Unified Facilities Criteria (UFC) 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points
- USAF Landscape Design Guide, C. Brickell and D. Joyce Pruning and Training, 1996.

Chapter 6, Site Elements Design Standards

- Virginia Erosion and Sediment Control Law
- Virginia Stormwater Management Law and Regulations
- UFC 3-210-10 Low Impact Development Design Manual
- Environmental Protection Agency (EPA) Technical Guidance on Implementing the Stormwater Runoff Requirements of Federal Projects under EISA 438
- EPA Guidance for Federal Land Management in the Chesapeake Bay Watershed May 12, 2010 Chapter 3 Urban and Suburban Runoff
- Virginia Stormwater Management Handbook, current edition
- Virginia Erosion and Sediment Control Handbook, current edition
- Fairfax County Public Facilities Manual
- Virginia Runoff Reduction Method
- Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting.
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Army Regulation (AR) 1-33, Memorial Programs
- Army Regulation (AR) 420-49, Utility Services
- Army Regulation (AR) 420-70, Buildings and Structures
- Army Regulation (AR) 420-72, Transportation Infrastructure and Dams
- Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques
- DoD 4525.8-M, DoD Official Mail Manual
- Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: Lighting for Exterior Environments (RP 33-99)
- Manual of Uniform Traffic Control Devices (MUTCD)
- MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings
- National Fire Protection Association (NFPA) 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants
- Technical Manual (TM) 5-663, Child Development Center, Play Area Inspection and Maintenance Program
- Technical Manual (TM) 5-803-5, Installation Design Manual
- Technical Manual (TM) 5-807-10, Signage
- TI 811-16, Lighting Design
- UFGS, Division 12 – FURNISHINGS, UFGS 129300, Site Furnishings
- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chapter 11

- Unified Facilities Criteria (UFC) 3-210-04, Design: Children's Outdoor Play Areas
- Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Anti-terrorism Standards for Buildings
- Uniform Federal Accessibility Standards (UFAS)

Appendix B, Technical Design Guidelines

- 2000 International Building Code (IBC 2000)
- Advisory Council on Historic Preservation
- American Standard for Nursery Stock (ANSI) Z60.1
- Americans with Disabilities Act Accessibility Guideline (ADAAG)
- Army Barracks Master Plan, Appendix I, Army Barracks Standards
- Army Lodging Standards
- Army Regulation (AR) 200-1, Cultural Resources Management
- Army Regulation (AR) 200-4, Cultural Resources Management
- Army Regulation (AR) 420-70, Buildings and Structures
- Army Regulation (AR) 525-13, The Army Force Protection Program (available only through the Army Knowledge Online web portal.)
- Clean Water Act of 1987
- Department of the Army Pamphlet (DA PAM) 200-4, Cultural Resources Management
- 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>
- DoD Instruction 2000.16, DoD Anti-terrorism Standards
- Fairfax County Outdoor Lighting Standards, September 2003.
- FEMA 356, Pre-standard and Commentary for the Seismic Rehabilitation of Buildings
- Forest and Wildlife Corridor
- Fort Belvoir Forest Management Plan
- ICCSC RP4, NISTIR 5382, Standards of Seismic Safety for Existing Federally Owned or Leased Buildings
- Memorandum for Record - The Army Standards for Electronic Key Card Access for all Facilities.
- Memorandum Subject: Revised Barracks Construction Criteria, dated May 2003
- Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing
- Resource Management Areas (RMA)

- Standards of Seismic Safety for Existing Federally Owned and Leased Buildings
- Technical Instructions (TI) 809-04, Seismic Design for Buildings
- Technical Instructions (TI) 809-05, Seismic Design Evaluation and Rehabilitation for Buildings
- Technical Manual (TM) 5-803-13, Landscape Design and Planting
- Technical Manual (TM) 5-809-10/Navy NAVFAC P-355/Air Force AFM 88-3, Chapter 13, Seismic Design for Buildings
- Technical Manual (TM) 5-809-10-2/Navy NAVFAC P-355.2/Air Force AFM 88-3, Chapter 13, Sec B, Seismic Design Guidelines for Upgrading Existing Buildings
- 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.)
- The Chesapeake Bay Preservation Act, Resource Protection Areas (RPAs)
- The Secretary of the Interior's Standards for the Treatment of Historic Properties
- 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.)
- UFC 4-010-02, DoD Security Engineering Manual (This document is in draft form. See the Security Engineering Working Group website.)
- Unified Facilities Criteria (UFC) 1.200-01, Design: General Building Requirements
- Unified Facilities Criteria (UFC) 1-300-05A, Installation Support
- Unified Facilities Criteria (UFC) 2-600-01, Installation Design, Chapter 12
- Unified Facilities Criteria (UFC) 3-210-05FA, Design: Landscape Design and Planting Criteria.
- Unified Facilities Criteria (UFC) 3-301-05A, Design: Seismic Evaluation and Rehabilitation for Buildings
- Unified Facilities Criteria (UFC) 3-310-03A, Design Seismic Design for Buildings
- Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Anti-terrorism Standards for Buildings
- Unified Facilities Criteria (UFC) 4-010-10, DoD Minimum Anti-terrorism 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 inquires regarding this document.)
- Unified Facilities Criteria (UFC) 4-022-01, Security Engineering: Entry Control Facilities/Access Control Points
- Uniform Federal Accessibility Standards (UFAS)
- United States Army Environmental Center Archeology
- United States Army Environmental Center Historic Buildings
- United States Army Environmental Center Native Indian Affairs
- Virginia Erosion and Sediment Control Law and Regulations (VESCL & VESCR)
- Virginia Non-point Source Pollution (NPS) Management Program

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