# ENTRY CONTROL FACILITIES DESIGN GUIDE


February 18, 2003

UNITED STATES AIR FORCE

***Foreword***

The Air Force mission is to defend the United States in air and space. Critical to this effort is the protection of Air Force people and assets located at Air Force installations worldwide. The first line of defense at our installations is the perimeter. Providing necessary security at our perimeter, including entry control facilities, will allow "life as normal" within the base to the extent possible. The Security Forces who are charged with operating our perimeter defense system have found their duties greatly intensified since the recent terrorist attacks on the United States. We must take every reasonable step to provide them the ability to operate efficiently and effectively in today's environment of heightened security.

This guide focuses on the appropriate configuration and design of perimeter entry control facilities. Incorporating the principles of this guide will not only enhance Air Force installation security, but will provide a safer and more comfortable working environment for Security Forces entry controllers. With well-designed entry control facilities we also create an image at our main entrance points that conveys our commitment to facilities excellence, the importance of the mission that lies within and our determination to see it through. Quality facilities will help the Air Force continue to build and protect the world's most respected air and space force.

JAMES M. SHAMESS, Brig Gen, USAF
Director, AF Security Forces
DCS/Air and Space Operations

EARNEST O. ROBBINS II, Maj Gen, USAF
The Civil Engineer
DCS/Installations and Logistics

***Guide Outline***

Chapter 1 – INTRODUCTION
This chapter provides a general overview and background information regarding the purpose of the guide, its mission, and general use.

Chapter 2 – BASIC GATE CATEGORIES
This chapter covers the three basic types of Entry Control Facility (ECFs). Functional relationship diagrams and notional site layouts have been included to show how the general information contained in this design guide can be implemented.

Chapter 3 – PLANNING
This chapter covers the planning phase of an ECF, including organizational participation and site selection and evaluation criteria.

Chapter 4 – DESIGN
This chapter contains specific functional information and design criteria for each type of ECF, including basic guidelines for sizing and configuring the facilities. It also includes examples of floor plans and other design information.

Chapter 5 – REFERENCE DOCUMENTS
This chapter includes hyper-links to and information about documents and resources containing information not covered in detail in this document.

***Publication Information***

Previous publications:
None

Revisions:
None

Publishing information:
This design guide provides the basic guidelines for evaluating, planning, programming and designing Entry Control Facilities (ECFs) for all Air Force installations worldwide.

Air Staff Endorsement Date:
December 2002

Website URL:
http://www.afcee.brooks.af.mil/dc/products/dcproducts.asp

OPR:
Headquarters, Air Force Center for Environmental Excellence Design Group
(HQAFCEE/DCD)
2735 Louis Bauer Drive, Brooks AFB, TX 78235-5219
http://www.afcee.brooks.af.mil/dc/dchome.asp

Primary Proponent:
HQ AIR FORCE SECURITY FORCES CENTER
(HQ AFSFC)
1517 Billy Mitchell Blvd, Bldg 945
Lackland AFB, TX 78236-0119
http://afsf.lackland.af.mil/

Project Managers:
Mr. Rick Sinkfield, AIA, and Mr. Boyce Bourland, PE/RA
Air Force Center for Environmental Excellence/Design Group

Writers:
Mr. Mark Askew and Mr. Johnny Evans, AIA
HELLMUTH, OBATA + KASSABAUM, INC.
Houston, Texas 77056
http://www.hok.com/

# Table of Contents

# CHAPTER 1 - INTRODUCTION

## 1A - Purpose

This guide provides the basic guidelines for organizing, evaluating, planning, programming, and designing Entry Control Facilities (ECFs) for Air Force (AF) installations worldwide, including the design of new ECFs and major and minor renovation projects. The guidelines will need to be adapted to the specific needs of each AF installation. This guide is not intended to be a manual for determining tactics, techniques, and procedures (TTPs).

This guide has been prepared for the use of Commanders, Base Civil Engineers, Security Forces, their staffs, design architects, and engineers. It covers the basic facility requirements and design considerations necessary to successfully develop a project. It does not provide comprehensive architectural and engineering information. It should also be used in conjunction with MAJCOM standards, base standards, and project-specific criteria.

Existing ECFs were designed to control entry under Threat Condition (THREATCON), now referred to as Force Protection Condition (FPCON), Normal and Alpha conditions. After September 11, 2001, ECFs started operating at higher levels of security including extended periods in FPCON Bravo. ECFs must now be configured so that security can be quickly and easily enhanced under increased FPCONs.

## 1B - ECF Description and Mission

ECFs serve as the entry point for all personnel, visitors, and deliveries to AF installations. The objective of ECFs is to prevent unauthorized access and maximize vehicular traffic flow. Priorities in the design of ECFs are:

1. Security
2. Safety
3. Capacity
4. Image

### *Security*

The first priority of an ECF is to maintain perimeter security. The ECF:

- is a part of the installation perimeter, which is the first physical line of a “defense in depth” strategy and a legal line of demarcation;
- must accommodate Random Antiterrorism Measures (RAMs), for sustained operations;
- must be able to operate at all FPCONs, including 100% vehicle inspections; and
- must have security features that protect against vehicle-borne threats and illegal entry.

***Safety***
ECFs must have a working environment that is both safe and comfortable for Security Forces (SF) personnel. Security Forces safety includes provisions for personal protection against attack and errant drivers. Special consideration must be given to climate, location, and orientation. For more detailed information on ballistic standards, commanders should refer to MIL-HDBK 1031/1A, Design Guidelines for physical Security of Facilities, and MIL-HDBK 1031/10, Design Guidelines for Security Fencing, Gates, Barriers and Guard Facilities as referenced on page 41 or available through the Installation Civil Engineer.

***Capacity***
The ECF must maximize vehicular traffic flow to eliminate undue delays that would affect base operations while maintaining vigilance against acts of terrorism.

***Image***
The ECF must be designed to impart an immediate impression of professionalism and commitment to facilities excellence and to convey the Air Force's commitment to the protection and safety of AF personnel.

## CHAPTER 2 – BASIC GATE CATEGORIES

Most major AF installations have three basic types of ECFs depending on the type of traffic that is expected to enter at the ECF:

- Visitors/DoD Personnel Gate
- DoD Personnel Only Gate
- Commercial Gate (deliveries/contractors)

Only two types of ECFs may be needed at some installations; others may require multiple instances of each type or a modified combination of gate types based upon specific installation conditions. For those Air Force, Air Force Reserve or Air National Guard installations with minimally manned or no Security Forces available, the requirements for the ECF shall be determined by the Commander, Security Forces, Civil Engineer, Communications, and Safety Office having jurisdiction over that installation. The programming office of the responsible MAJCOM shall validate requirements.

The functional diagrams and notional site layouts in this guide illustrate general relationships and desired adjacencies for each type of ECF. These illustrations are not drawn to any scale and are not intended to depict the importance or size of each element.

## 2A –Visitors/DoD Personnel Gate

***Figure 2A.1 – Visitors/DoD Personnel Gate: Functional Relationships***

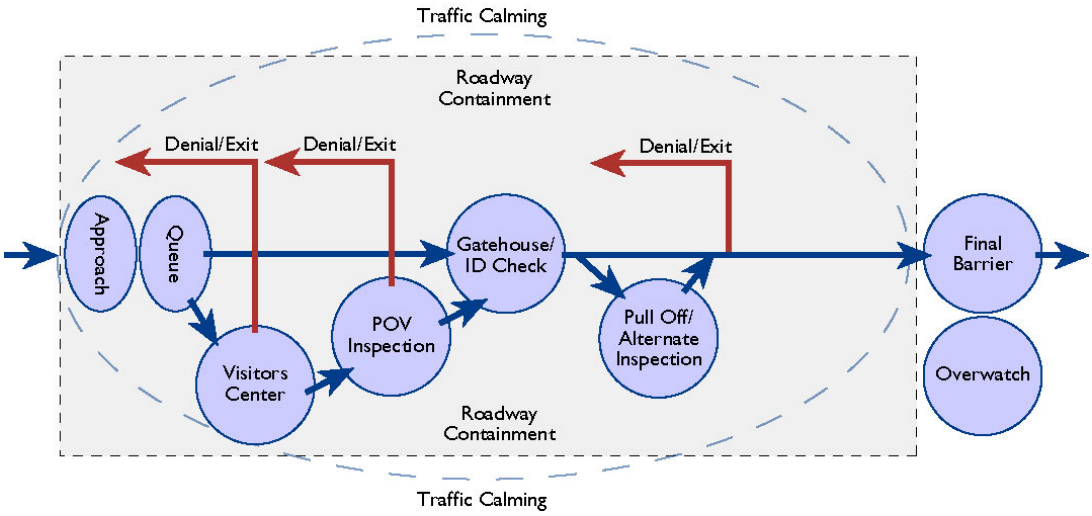
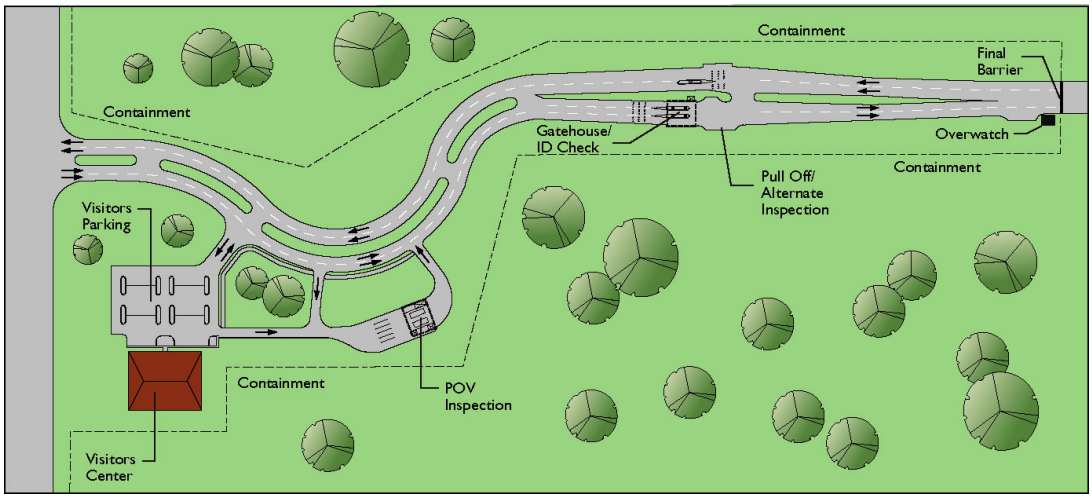



***Figure 2A.2 – Visitors/DoD Personnel Gate: Notional Layout***



## 2B –DoD Personnel Only Gate

***Figure 2B.1 – DoD Personnel Only Gate: Functional Relationships***

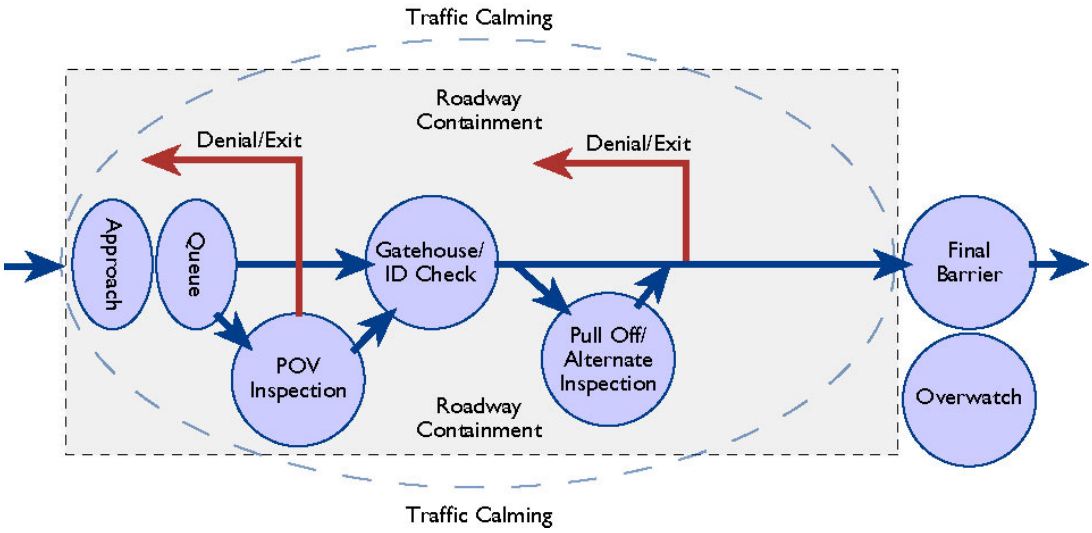
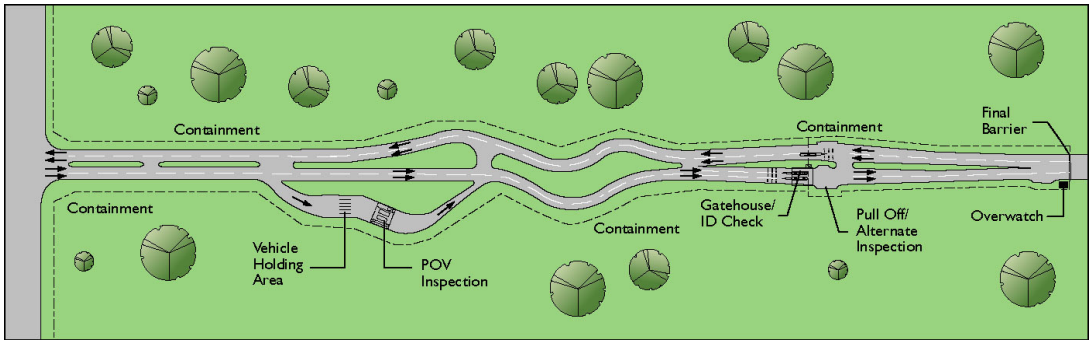



***Figure 2B.2 – DoD Personnel Only Gate: Notional Layout***



## 2C –Commercial Gate

***Figure 2C.1 – Commercial Gate: Functional Relationships***

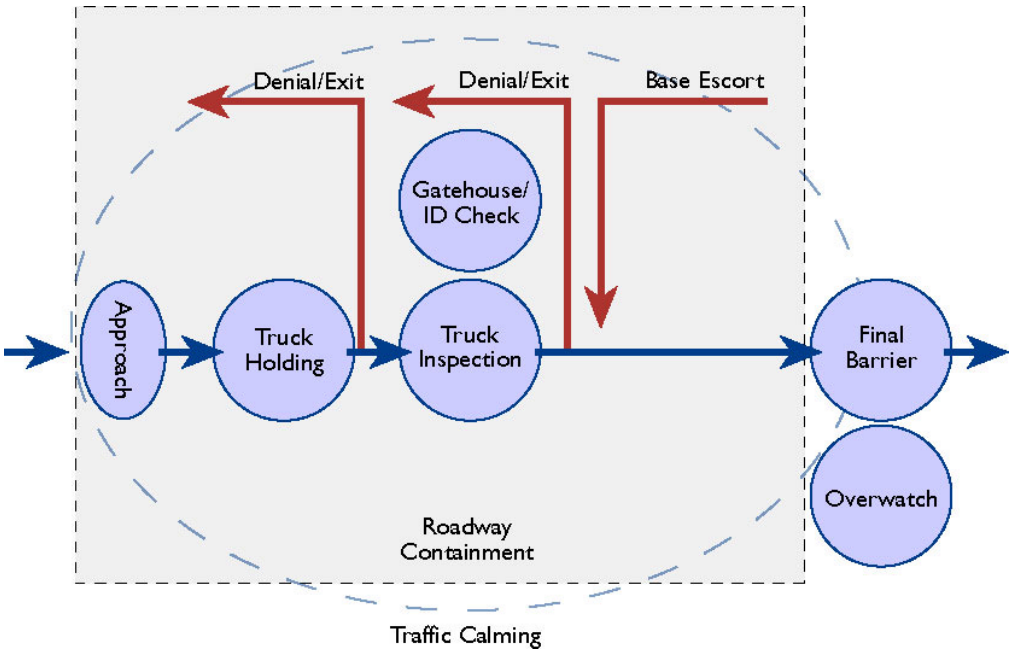
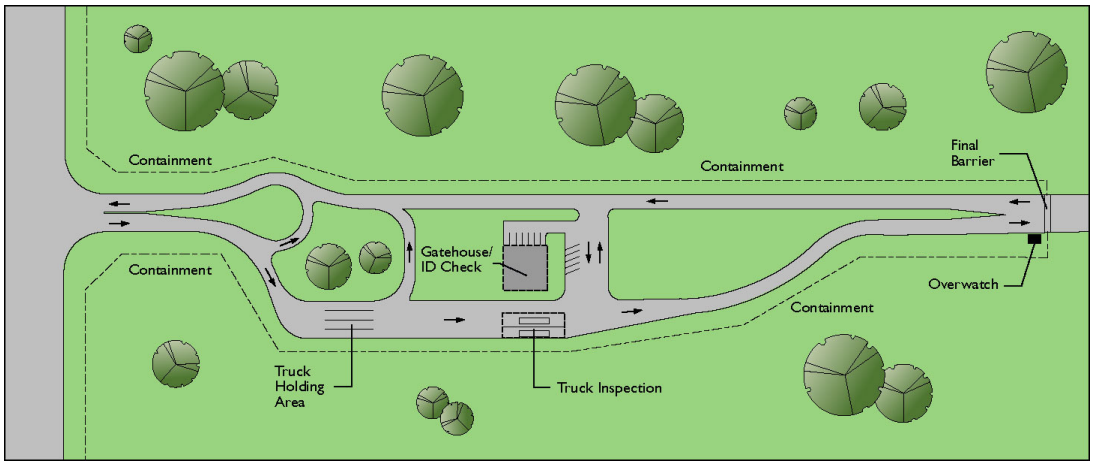


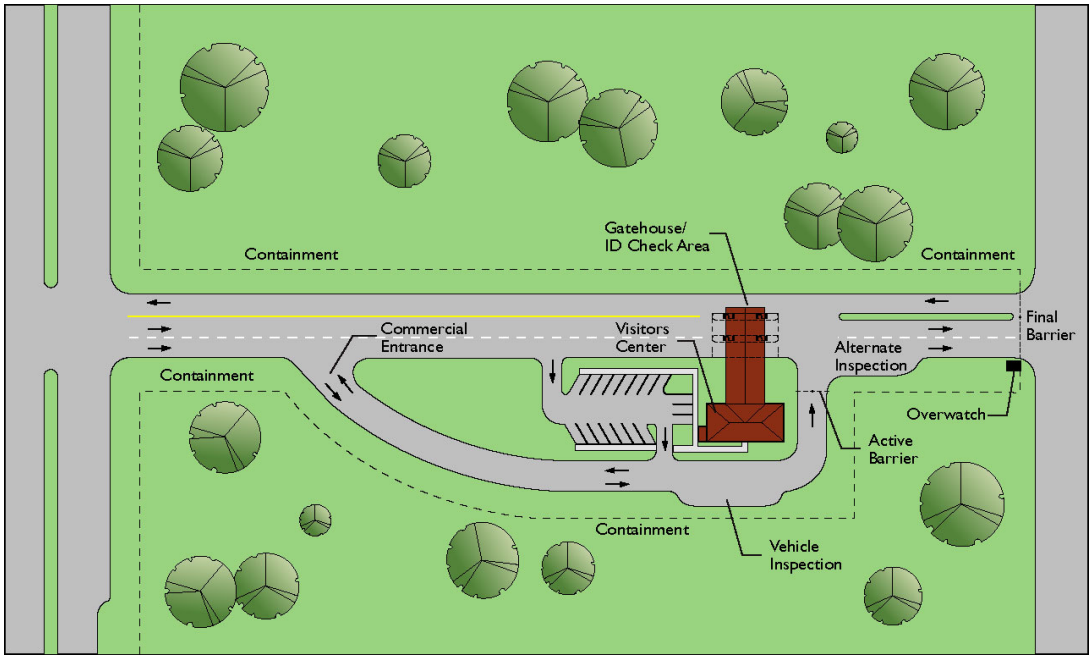

***Figure 2C.2 – Commercial Gate: Notional Layout***



## 2D Alternative Gate Layouts

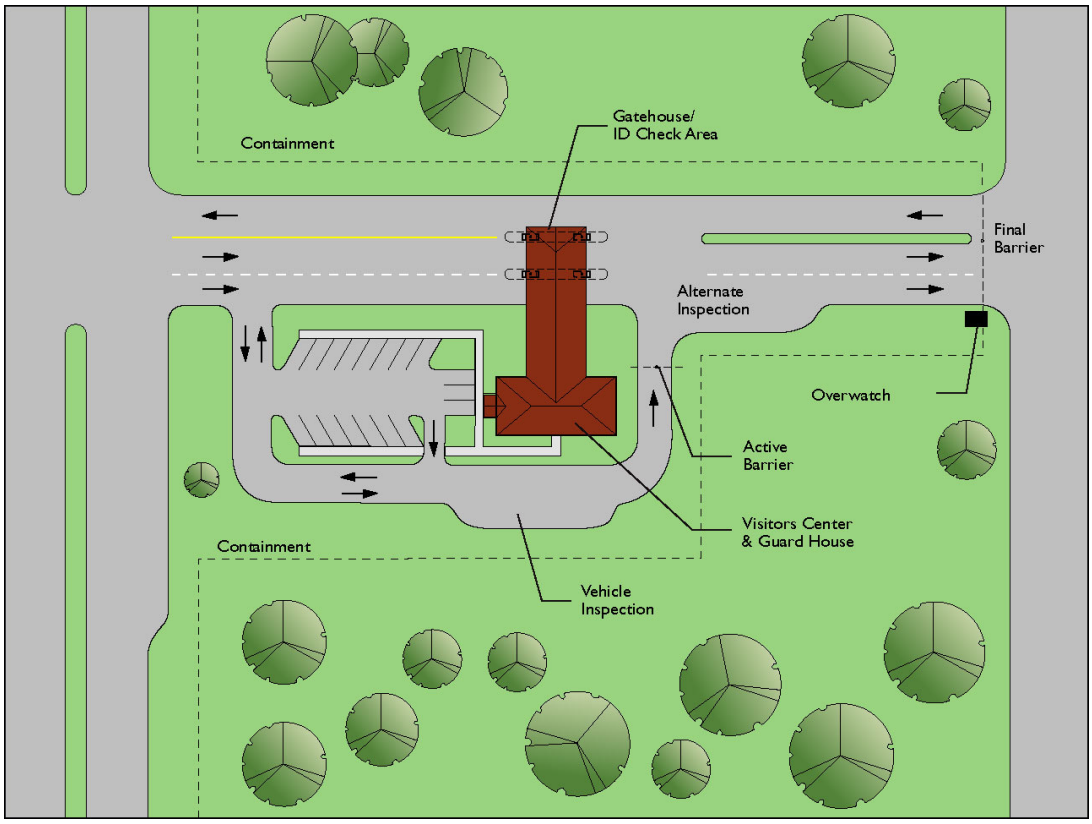
A minor installation such as an Air Reserve Base or Air National Guard cantonment may require only a single entrance. These ECFs need to combine the features of each type of ECF. A notional layout for a combined ECF is shown below.

***Figure 2D.1 – Combined Commercial/Visitors/DoD Alternative Gate: Notional Layout***



If site constraints prohibit a sequential layout, an alternative layout can be used that consumes far less space, as shown below.

***Figure 2D.2 –Visitors/DoD Personnel Gate – Restricted Real Estate Option: Notional Layout***



# CHAPTER 3 – PLANNING

## 3A - Overview

This chapter describes the planning of an ECF project, including organizational participation, site selection and evaluation.

### *Organizational Participation*

Cooperation among the representatives of stakeholder organizations is critical to the success of any project. Starting early in the process, the following groups should be involved in the planning, programming, and design of an ECF:

- Security Forces
- Civil Engineer
- Communications
- Comptroller
- Contracting
- Safety
- Transportation
- Host Nation Installation Representative (as applicable)

## 3B – Site Selection Criteria

### *User Demand*

Site selection for a new ECF starts with an extensive evaluation of the anticipated demand for access to the installation, an analysis of traffic origin and destination, and an analysis of the capability of the surrounding road network to tie in to the ECF, including its capacity to handle additional traffic. Analyses of traffic patterns at installation entry points should include the local Department of Transportation, since any traffic changes will likely have some effect or impact on civilian traffic patterns. The expansion capacity should also be considered.

### *Existing Terrain and Available Space*

The existing terrain can have a significant impact on the suitability of a potential ECF site. Flat terrain with no thick vegetation is generally preferred. A gentle rise in elevation up to the gatehouse allows for a clear view of arriving vehicles, which helps entry controllers monitor potential threats. Consider how existing natural features such as water bodies or dense tree stands may enhance perimeter security and vehicle containment through the entry control facilities.

ECF spatial requirements vary depending on the type, the traffic demand, and the security measures necessary. The installation should have an approach corridor between 43 meters (140 ft.) and 55 meters (180 ft.) wide depending upon traffic volume. These corridors must have a dedicated right-of-way protected from encroachment by buildings, trees, and other objects. This will provide a safe, clear roadway and accommodate future expansion.

Space must also be available for the other ECF elements. The amount of space required for these depends on the layout selected in accordance with these guidelines and should include space for parking, buffer and transitional space between ECF elements, and surrounding land use.

***Future Development Plans***

Future development plans for the installation and the surrounding community should be carefully evaluated when selecting a site for new ECFs or modifying existing facilities. All ECF development plans should accommodate future modifications necessitated by increased demand or revised security measures. When practical, do not construct non-ECF related structures within a 762 meter (2,500 ft) radius from any point within the containment area, to facilitate the establishment of a cordon and evacuation procedures. (Reference Figure 2C.2)

***Compatible Land Use***

ECFs should not be located near restricted/clear zones, protection-level resources, and identified vulnerable assets. ECFs should also be located away from housing, school, and commercial areas, both on and off base, to avoid interference with pedestrians, parked cars, and driveways.

***Environmental Constraints***

Consider the impact to existing environmental systems as well as constraints that may prohibit development in certain areas, including wetlands, protected habitats and resources, and restoration sites.

**3C – Antiterrorism Construction Standards**

Comply with the requirements of Unified Facilities Criteria UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, for all new construction and renovation projects.

# CHAPTER 4 –DESIGN

## 4A - Overview

This chapter covers the design of each element of an ECF, including such information as the square-footage requirements, lighting/utility details, and parking requirements. Programmers and designers must comply with all applicable requirements, including MAJCOM-specific requirements. Designers are encouraged to involve both MAJCOM CE and SF representatives early in the design process.

This chapter also contains floor plans and layouts that show how to apply the design principles to particular ECF elements. These are examples only, however, and not proposed solutions. Not all facilities are typical and an installation and MAJCOM may have unique requirements that also need to be considered in the design of an ECF.

Since ECFs are the first buildings visitors and personnel see when entering an installation, they must convey strength and permanence and have a professional appearance that is architecturally compatible with the rest of the installation.

## 4B - Approach/Queuing

The approach to the installation should be designed to accommodate peak traffic demand without impeding traffic flow in the surrounding road network. Refer to Military Traffic Management Command MTMC Pamphlet 55-15 Traffic Engineering for Better Gates for gate volumes and lane capacity design.

### *Traffic Calming*

Traffic calming is needed on inbound and outbound roadways to control vehicle speed and slow incoming vehicles before they reach the gate so that SF personnel have adequate time to respond to unauthorized activities. This includes provisions for restricting traffic flow approaching the ID check area during increased FPCONs. Appropriate traffic calming measures include:

- Road alignment (circle, serpentine)
- Drop-in or retractable bollards (to cause serpentine traffic flow)
- Swing gates
- Speed humps or speed tables
- Pavement texture

### *Landscaping*

Landscape plantings can dramatically improve the aesthetics of the installation and visitors first impressions of an installation. However, landscaping should not obstruct the view of the entry approach from the gatehouse. Refer to the USAF Landscape Design Guide for additional information.

### *Signage and AF Image Identity*

Comply with UFC 3-120-01, *Air Force Sign Standard*, and USAF symbol guidelines at http://www.af.mil/airforcestory/guidelines.shtml regarding signage for all new

construction and renovation projects. These guidelines now mandate that base identification signs show only the USAF symbol and the name of the base or installation.

A comprehensive signage plan should be prepared for each ECF that is compatible with the installation's signage program and complies with local standards. The plan should include the following types of signs:

- Traffic Regulatory and Directional Signs, which control traffic flow and direct vehicles to specific gates, ID check lanes or the Visitors Center

- Entry Control Procedures Signs, which explain current ID check procedures for drivers; current FPCON status should not be displayed

- Variable Message Signs, which give information on local events or distinguished visitors. These signs should be located inside the installation and at least 200 feet beyond the ID check area

***Geometric Roadway Design***

The geometric design of gate roadways depends on its classification (minor arterial, major arterial, expressway), the type and volume of traffic expected, anticipated roadside development, the space available, the security level, and other factors. This section summarizes key aspects of the design of an installation roadway. Refer to MTMCTEA Pamphlet 55-15 Traffic Engineering for Better Gates for additional information.

- *Right-of-Way*
  The right-of-way comprises the entire cross section of the roadway, including the median, traffic lanes, bike lanes, shoulders, borders, sidewalks, curbs and gutters, drainage, and lateral clear zones. All components of a gate, such as gatehouses, ID check lanes, ID checker medians, inspection areas, and parking lots, should be in or immediately adjacent to the right-of-way.

  The right-of-way through a gate should be as wide as practical, especially if future expansion is anticipated. A minor 2-lane gate should have a minimum right-of-way width of 16.46 meters (54 ft). Right-of-way widths of 21.33 meters (70 ft) to 36.58 meters (120 ft) are required for larger gates. Refer to MTMCTEA Pamphlet 55-15 Traffic Engineering for Better Gates for additional information.

- *Lane Width*
  As a general rule, lanes approaching the gate should be 3.66 meters (12 ft) wide, plus another 0.61 meters (2 ft) on each side for the curb and gutter. If moderate-to-heavy bicycle traffic is expected, lane widths of 4.57 meters (15 ft) to 5.18 meters (17 ft) are recommended. However, lanes at the gatehouse should be 3.04 meters (10 ft) wide to slow motorists down and place them close to the ID checker. At least one inbound lane, usually the outer lane, at multi-lane gates should be 3.66 meters (12 ft) wide to accommodate larger, wider vehicles.

Consider snow removal requirements and address required width between ID check islands for snow removal equipment.

- *Medians*
  Medians are used to:
  - Separate opposite traffic flows
  - Provide a protected zone for left or U turns
  - Minimize headlight glare
  - Create an open green space for landscaping
  - Provide space for signs
  - Provide space for a gatehouse

  If space is extremely limited, the minimum width of the median at the ECF should be 4.88 meters (16 ft). The desired median width is 9.14 meters (30 ft), which protects vehicles making left or U-turns. If the median is to provide turnaround capability for larger trucks, it should be a minimum of 12.19 meters (40 ft) wide.

- *Curbs and Gutters*
  Curbs are primarily intended to contain vehicles within the roadway and to provide an elevated platform for personnel who must stand close to the moving vehicles.

  Curbs should be 152mm (6 inches) high at the approach to a gate. Curbs where ID checks are performed can be 229mm (9 inches) high to increase the safety for entry controllers. However, if crash cushions or concrete deflections are constructed in advance of these positions, the curbs should be 152mm (6 inches) high so that the checkers are not too high above the seated drivers. Higher curbs, a minimum of 457mm (18 inches) high, are recommended as a low-cost means to prevent motorists from leaving a road to bypass security or to access a sensitive base area.

  If a gutter has a different color and texture than the road surface and has a longitudinal joint, it should not be considered part of the travel lane width. One exception to this is the total lane width at ID checkpoints, which should be either 3.04 meters (10 ft) or 3.66 meters (12 ft), as previously identified.

- *Shoulders*
  Shoulders are discouraged near an ECF because motorists tend to go faster where there are shoulders. Shoulders also make it harder to constrain and control the movement of vehicles. If used, shoulders should be 1.83 meters (6 ft) to 2.44 meters (8 ft) wide, and all fixed objects, such as signs, trees, and posts, should be at least 1.83 meters (6 ft) from the edge of the shoulder or 3.66 meters (12 ft), from the edge of the travel lane. Where a road edge changes from a shoulder to a curb, the transition area should be gradual to give the driver time to react. Use the formula given below to calculate the shoulder-to-curb transition taper and divide by three.

- *Transition Tapers*
  Lane tapers allow drivers to respond to a change in road alignment. A common flaw is that road transitions are often too short. Tapers should be used when:
  - Lanes are separated on the approach to a gate island
  - Lanes on a road are added or dropped before or after a gatehouse

  The appropriate length for a taper at an island is $WS^2/60$, where W = the width of the transition (in feet) and S = the speed of vehicles or the posted speed limit, but should be at least 30.48 meters (100 ft) long. The minimum taper should be at a ratio of 10 to 1 for an added lane and 30 to 1 for a dropped lane. Refer to MTMCTEA Pamphlet 55-15 Traffic Engineering for Better Gates for additional information.

- *Corner Radii*
  The radius of a corner or turning lane depends on the largest vehicle expected to use the lane and the average turning speeds, which will be quite low around an ECF. Other factors to be considered include the available right-of-way, the angle of the intersection, and pedestrian activity. The following minimum radii should be used:
  - Locations serving only passenger vehicles: 4.57 meters (15 ft) to 9.14 meters (30 ft); preferred is 6.1 meters (20 ft).
  - Corners where RVs, SUVs, or similar vehicles turn: 10.67 meters (35 ft)
  - Intersection where large trucks (WB-50) including semi-trailers (WB-67) turn: 15.24 meters (50 ft)
  - Turnarounds for large trucks: 19.81 meters (65 ft)

- *Pull-Off or Alternate Inspection Area*
  Angle or parallel parking requiring vehicles to back into the through lanes should never be used at a gate. Instead, off-street parking or turnouts should be used with appropriate radii and tapers, respectively.

- *Parking Lot*
  If more than two visitors will be concurrently processed on a routine basis at a Visitors Center, an off-street parking lot is required. Spaces should be located to minimize the walking distance and potential interference with moving or parked vehicles. Parking spaces should typically be 2.74 meters (9 feet) to 2.90 meters (9'-6") wide and 5.64 meters (18'-6") deep. Refer to MTMCTEA Pamphlet 55-15 Traffic Engineering for Better Gates for additional information.

- *Channelization Islands*
  The proper path through and around raised islands should be readily visible through the use of approach pavement markings. This is especially true for an ECF, where there may be several islands for security personnel performing ID

checks and monitoring base traffic. The colors, line widths, and other design features of the markings must adhere to national standards specified in the Manual of Uniform Traffic Control Devices (MUTCD).

- *Pavement Surface*
  Rear-end crashes are common at an ECF, where motorists are required to make frequent stops and there are other distractions. A pavement with a high coefficient of friction should be installed to reduce the stopping distance and minimize this risk. This can be accomplished with a coarse mix, chip seal, or a textured or grooved pavement. The approach to the gatehouse should also have excellent drainage, and, in cold weather locations, a heated pavement should be installed to prevent snow and ice build-up.

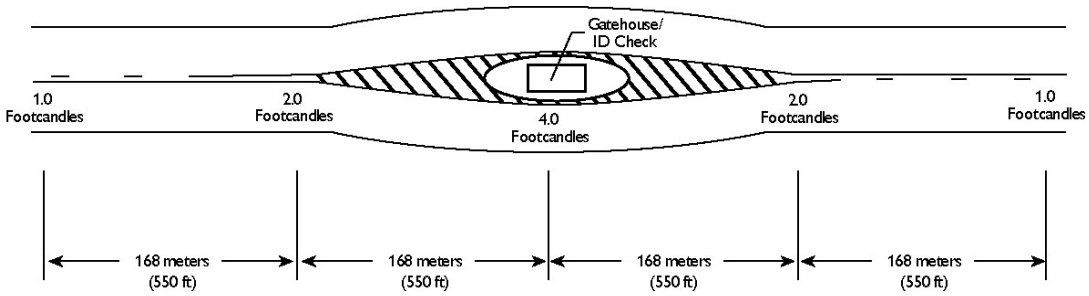
***Site Lighting Design Criteria***

A minimum surface lighting average of 4 horizontal foot-candles should be used so that pedestrians, islands, guards, and other hazards can be seen. Where practical, high-mast lighting up to 24 meters (80 ft) high is recommended, because it gives a broader, more natural light distribution, requires fewer poles (less hazardous to the driver), and is more aesthetically pleasing than standard lighting. Consult the airfield clearance requirements to determine the maximum heights for high-mast lighting.

Transitional lighting is necessary on gate approaches so that drivers are not blinded during arrival or departure and so entry controllers may identify approaching vehicles. High-mast lighting provides its own transition because of the distance reached by the light. However, standard lighting (7–15 meters, or 25–50 ft high) must have transitional lighting in which the illumination level is reduced, or increased, by 50 percent within the average distance traveled in 15 seconds. For example, at a 40-kph (25-mph) gate, where the illumination level is 4 foot-candles, the illumination level should be 2 foot-candles at 168 meters (550 ft) and 1 foot-candle at 334 meters (1,100 ft). A third transition is not needed. Actual lighting locations must be determined on a case-by-case basis and depend on the height, light source, and lens distribution.

Lighting of the gatehouse should give drivers a clear view of the gatehouse and guards a clear view of the drivers and vehicles. Lighting should be mounted to shine transversely to the roadway; it will then illuminate the roadway in front of the gatehouse, the driver, and the guard. Bright lights should not be directed into the driver's face or backlight important signage. Lighting should not illuminate the Security Forces gate guard or his/her activities.

***Figure 4B.1 – Roadway Lighting***




***Light Sources***

Light sources for ECFs should be chosen for their luminous efficiency and color. High-pressure sodium and metal halide lamps are good in terms of color quality and very good in terms of luminous efficiency. Lamps to be avoided include low-pressure sodium, mercury vapor, fluorescent, incandescent, and tungsten halogen. However, incandescent and tungsten-halogen lamps are recommended for spotlighting where "instant-on" capability is needed.

If medians are an acceptable width of at least 4.88 meters (16 ft), light poles should be mounted in the median because this requires fewer poles than does roadside mounting, reducing both the cost and number of fixed-object hazards. On a curbed median, the clearance from the face of the curb should be at least 600mm (2 ft), but 1.8 meters (6 ft) is preferable. Light poles on an uncurbed median, should be at least 3.6 meters (12 ft) from the lane edge or 1800 mm (6 ft) from the shoulder edge, whichever is greater.

When the median is not wide enough, light poles should be placed along the right side of the road. Such poles should be breakaway, except where a falling pole would do more harm to people on foot than a fixed pole to the driver, such as in a crowded area or around the gatehouse or Visitors Center.

***Commercial Truck Holding Area***

If space is available, the traffic queuing area for a commercial vehicle gate should be designed to hold vehicles waiting inspection in a stacked configuration. That is, rather than vehicles queuing sequentially in the roadway (as is the case with a Visitor/DoD Personnel approach), they should be able to park side-by-side until cleared into the inspection area. This configuration requires less space, avoiding problems with the size of commercial vehicles. Consider laying out the holding area at an angle to the inspection facility to minimize the opportunity for casual observation of the inspection process.

**4C – Visitors Center**

A Visitors Center provides preliminary entry control for visitors to the installation or those who require passes for unregistered vehicles (referred to collectively as visitors).

***Design Criteria***

The Visitors Center should be able to process 12 – 20 visitors per hour per processor. The processing capacity required is determined by the peak hourly requirements at the installation. The following items should be considered during the design of each element of a Visitors Center:

***Waiting Area***

- Provide a comfortable environment with adequate seating for visitors to await processing (based on peak hourly requirements)
- Provide a designated area for a computer station to be used by visitors to enter registration information. This computer station should network from each processing station to the office area so that registration information can be accessed
- Provide a TV with cable service
- Provide a water fountain
- Provide an area for vending machines that is accessible to visitors
- Provide a vestibule if required by local climatic conditions

***Parking***

- Provide adequate parking based on typical peak volume. Provide reserved parking spaces for a minimum of two SF personnel vehicles. Provide Reserved Handicapped parking spaces per Americans with Disabilities Act Accessibility Guidelines (ADAAG).

***Service Counter***

- Include sufficient desktop work surfaces and countertop space for one to three processing stations, depending on the size of the base and anticipated maximum processing requirements. Allow three to five minutes per person for processing. Assume that approximately 12-20 people can be processed each hour on average per processing station.
- Include a computer station with networking and Internet access for each processing station
- Provide photo ID capability at each processing station. Install a photo backdrop
- Provide wiring at each processing station for an alarm or panic button

***Administration Office***

- Provide an enclosed office for two workstations and a filing cabinet
- Provide video surveillance equipment for the interior and exterior areas of the Visitors Center. The Visitors Center and the Gatehouse/ID Check Area at each entrance will have video surveillance capabilities
- Provide Internet connectivity, telecommunications, a closed-circuit television system, and a radio battery recharging area

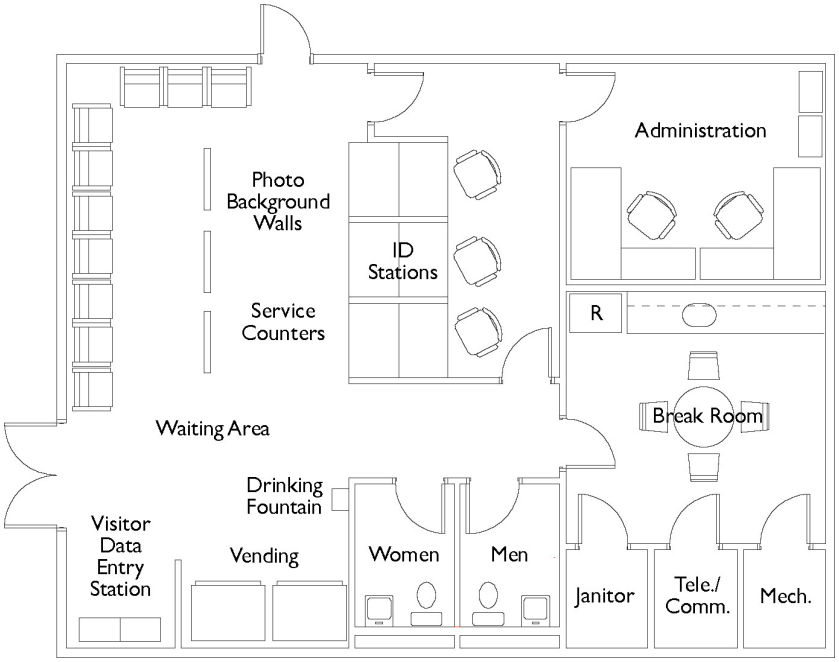
***Break Room***

- Locate the break room so that it is out of the direct line of sight of the waiting/seating area
- Provide a refrigerator, microwave, and sink
- Provide seating for four SF personnel

***Restrooms***

- Provide men's and women's restrooms for public and SF use per ADAAG requirements. Provide accommodations for baby-changing stations in each restroom.

***Figure 4C.1 – Visitors Center: Notional Layout (Note: Windows Not Shown)***



### *Square Footage Table: Visitors Center*

| *Space Name* | *Area (NSF*)* | *Quantity* | *Comments* |
|---|---|---|---|
| ***Waiting Area*** | 150 | Varies | Provide area based on at least 3 chairs per workstation and queuing space. (projected number of vehicle occupants waiting x 15 net square foot planning factor per visitor). Assumes 10 visitors waiting. |
| ***ID stations*** | 225 | Varies | Provide a minimum of one. The quantity of stations is based on peak hourly demand (number of visitors/10). Assumes 36-60 visitors per hour for 3 ID stations. Use a 75 NSF planning factor per workstation. |
| ***Administration*** | 140 | 1 | 2 workstations |
| ***Break Room*** | 150 | 1 | Provide seating for 4 at the table. |
| ***Men's Toilet*** | 40 | 1 | |
| ***Women's Toilet*** | 40 | 1 | |
| ***Vending*** | 40 | 1 | |
| ***Tele./Comm.*** | 20 | 1 | |
| ***Janitor*** | 20 | 1 | |
| ***Mechanical*** | 20 | 1 | |
| ***Visitor Data Entry*** | 20 | 1 | |
| **Total** | 865 | | |

* not including circulation or wall thickness

### *Finish Schedule: Visitors Center*

| *Space Name* | *Location* | *Description* |
|---|---|---|
| **Waiting Area** | *floor* | quarry tile |
| | *wall* | vinyl wallcovering |
| | *base* | ceramic tile base |
| | *ceiling* | acoustical ceiling tile |
| ***ID Station*** | *floor* | carpet with pad |
| | *wall* | vinyl wallcovering |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Office*** | *floor* | carpet with pad |
| | *wall* | vinyl wallcovering |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Break Room*** | *floor* | vinyl tile |
| | *wall* | vinyl wallcovering |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Men's Toilet*** | *floor* | ceramic tile |
| | *wall* | ceramic tile and vinyl wallcovering |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Women's Toilet*** | *floor* | ceramic tile |
| | *wall* | ceramic tile and vinyl wallcovering |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Vending*** | *floor* | vinyl tile |
| | *wall* | vinyl wallcovering |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Tele./Comm.*** | *floor* | vinyl composition tile |
| | *wall* | paint |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Janitor*** | *floor* | sealed concrete |
| | *wall* | paint |
| | *base* | none |
| | *ceiling* | acoustical ceiling tile |
| ***Mechanical*** | *floor* | sealed concrete |
| | *wall* | paint |
| | *base* | none |
| | *ceiling* | acoustical ceiling tile |
| **Visitor Data Entry** | *floor* | quarry tile |
| | *wall* | vinyl wallcovering |
| | *base* | ceramic tile base |
| | *ceiling* | acoustical ceiling tile |

## 4D – Visitor/DoD Personnel Inspection Area

Vehicles are inspected in accordance with local directives, from random inspections to inspections of all vehicles entering the installation. Once vehicles have been inspected, they do not have to pass through the ID check station; the exit lane from the inspection area may bypass entry control and merge into other inbound traffic downstream. Active

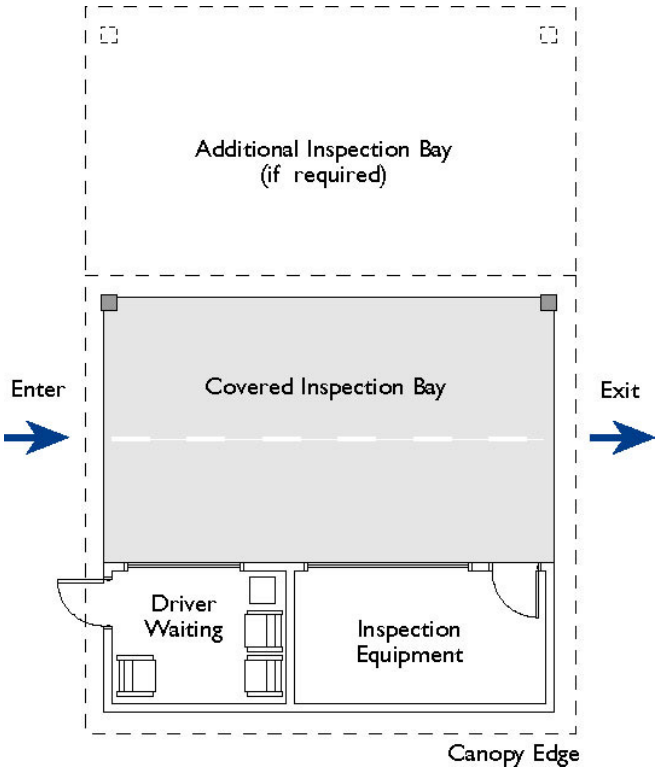
barriers and procedures must be in place to prevent unauthorized vehicles from bypassing entry control.

***Design Criteria***

To the extent possible, the inspection area should not be immediately adjacent to inbound traffic lanes. While this separation is primarily for safety reasons, some screening of the inspection procedure from public view is also desired. Appropriate landscape plantings should be placed to accomplish this. Other considerations include:

- Consider current and future inspection technologies (e.g. Above Vehicle Surveillance Systems [AVSS], Under Vehicle Surveillance Systems [UVSS], ion scanning, and x-ray equipment). Provide inspection equipment area as necessary.
- Provide a driver waiting area if local inspection procedures and equipment require that the driver be separated from the vehicle for some length of time. Provide seating for 2 occupants per vehicle undergoing inspection.
- Provide 4.5 x 7.2 meters (15 ft x 25 ft) inspection bays that can be enclosed, if necessary, to protect inspection equipment in the event of bad weather.
- Consider the use of underground inspection pits.

***Figure 4D.1 – Visitors/DoD Personnel Inspection: Notional Layout***



***Square Footage Table: Visitor/DoD Personnel Inspection Area***

| *Space Name* | *Area (NSF*)* | *Quantity* | *Comments* |
|---|---|---|---|
| ***Inspection Bay*** | 375 | 1 | NSF area for each bay required |
| ***Driver Waiting*** | 75 | 1 | Provide area based on peak hourly demand. (number of stations/10 x 15 net square foot planning factor per visitor). Assumes 10 visitors waiting. |
| ***Inspection Equipment*** | 100 | 1 | |
| **Total** | 550 | | |

* not including circulation or wall thickness

***Finish Schedule: Visitor/DoD Personnel Inspection Area***

| *Space Name* | *Location* | *Description* |
|---|---|---|
| ***Inspection Bay*** | *floor* | sealed concrete |
| | *wall* | masonry (painted if necessary) |
| | *base* | none |
| | *ceiling* | painted exposed structure |
| ***Driver Waiting*** | *floor* | vinyl tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Inspection Equipment*** | *floor* | sealed concrete |
| | *wall* | masonry (painted if necessary) |
| | *base* | none |
| | *ceiling* | painted exposed structure |

**4E - Commercial Vehicle Inspection Area**

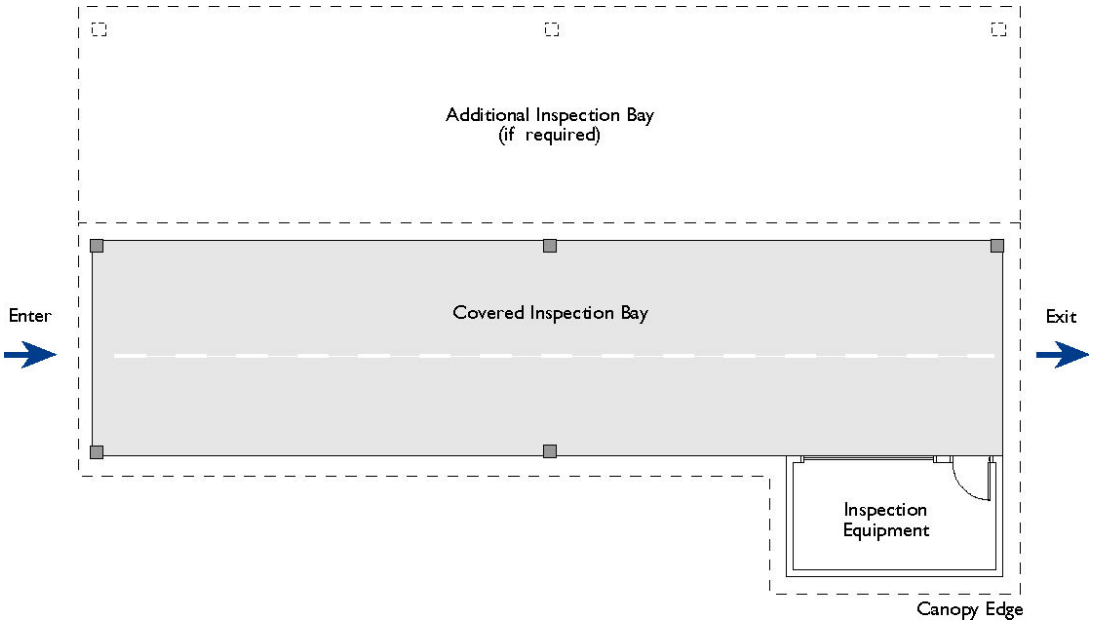
Provide for inspection of all commercial vehicles (i.e., contractor and delivery vehicles) before they enter the installation.

***Design Criteria***

Inspection areas should be large enough to accommodate a minimum of one commercial vehicle and a pullout lane. They should also be covered and capable of accommodating the undercarriage plus overhead inspection equipment. Some screening of the inspection procedure from public view is also desired. Appropriate landscape plantings should be placed to accomplish this requirement.

- Size inspection areas to be a minimum of 5.5 meters (18 ft) wide x 24.4 meters (80 ft) long and 5.4 meters (17 ft 6 in) high that can be enclosed to protect inspection equipment in the event of bad weather
- Consider current and future inspection technologies (e.g. AVSS, UVSS, ion scanning, and x-ray equipment)
- Consider the use of underground inspection pits

***Figure 4E.1– Commercial Vehicle Inspection Area: Notional Layout***




***Square Footage Table: Commercial Vehicle Inspection Area***

| *Space Name* | *Area (NSF*)* | *Quantity* | *Comments* |
|---|---|---|---|
| ***Inspection Bay*** | 1440 | 1 | |
| ***Inspection Equipment*** | 100 | 1 | size for anticipated technologies |
| **Total** | 1540 | | |

* not including circulation or wall thickness

***Finish Schedule: Commercial Vehicle Inspection Area***

| *Space Name* | *Location* | *Description* |
|---|---|---|
| ***Inspection Bay*** | *floor* | sealed concrete |
| | *wall* | masonry (painted if necessary) |
| | *base* | none |
| | *ceiling* | painted exposed structure |
| ***Inspection Equipment*** | *floor* | sealed concrete |
| | *wall* | masonry (painted if necessary) |
| | *base* | none |
| | *ceiling* | painted exposed structure |

## 4F – Gatehouse and ID Check

The ECF must be designed so that the authorization of approaching vehicles and occupants to proceed onto the installation can be adequately assessed, and the safety of both gate guards and approaching vehicles can be maintained during periods of peak volume. Consider providing a walkway and turnstile for pedestrians and a dedicated bicycle lane based on demand and local conditions.

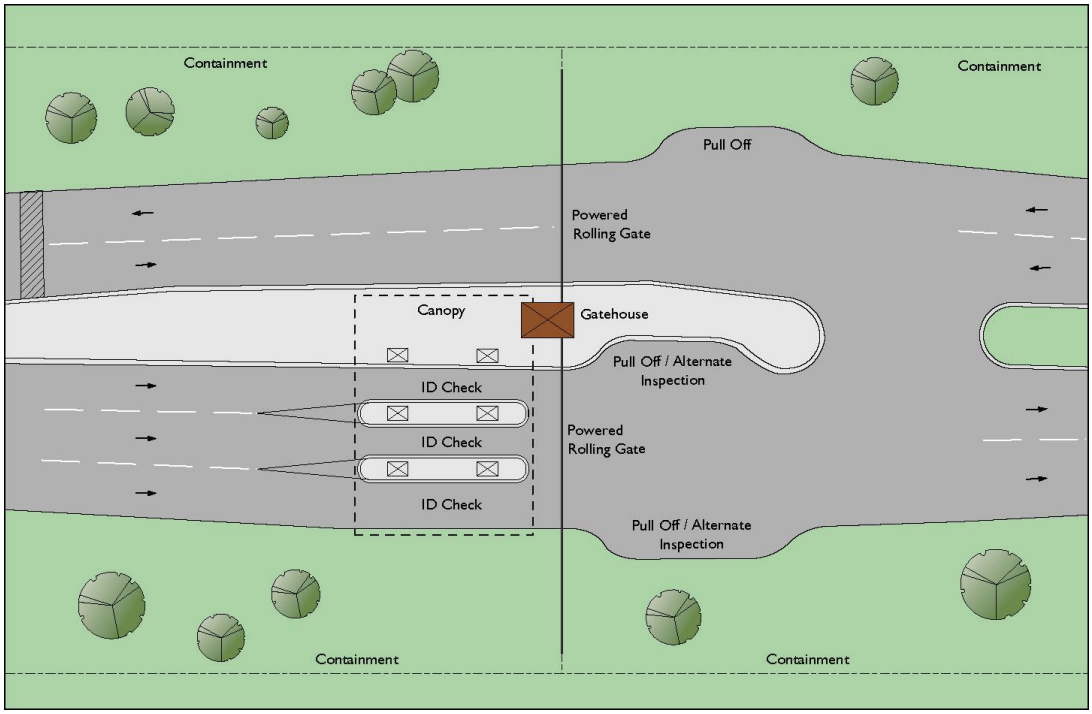
The gatehouse contains the workstations and communication equipment of the SF personnel. It also is the place of refuge in the event of an attack on SF personnel. ID checking is done on the islands between the traffic lanes. This area should be protected from both falling and windblown precipitation, and provide some measure of protection against hostile activity.

***Visitor/DoD Personnel Gatehouse and ID Check Area***

Entry controllers will be present regardless of the type of ID check being employed and must be protected from the elements and from motorists. This protection should consist of canopies, windbreaks, crash attenuators, and raised platforms.

- The most effective configuration for manually checking IDs is to have 2 entry controllers per lane (i.e., tandem processing); islands should be 1.83 meters (6 ft) wide x 21.33 meters (70 ft) long and have crash attenuators.
- Automated ID checking equipment should be installed on islands in front of the gatehouse at a sufficient distance to enable a rejected vehicle to stop and be directed to the reject/denial traffic lane. Locations for the equipment should be coordinated with the equipment manufacturers.
- Islands for automated ID checking equipment should be sized to accommodate manual ID checks in the event of problems with the automated systems
- For safety reasons, consider providing pavement heating if required by local climatic conditions

***Figure 4F.1– Visitors/DoD Personnel Gatehouse and ID Check Area: Notional Layout***



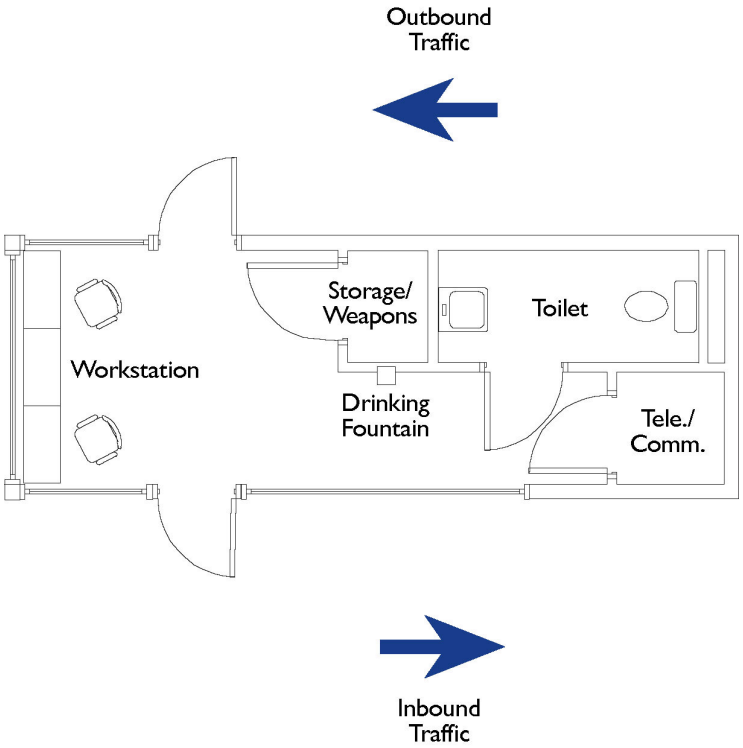

***Design Criteria***

A Visitors/DoD Personnel gatehouse should be located between inbound and outbound traffic lanes. This building functions as the central point for the control, surveillance, and notification of entry control activities. Gates should be located in the vicinity of the gatehouse that can stop both inbound and outbound traffic if necessary, effectively sealing the perimeter of the installation. Visitors/DoD Personnel gatehouses should have the following design features:

- Accommodate three to five SF personnel
- Limited view window glass—windows should limit viewing into the facility to the extent possible without restricting viewing out of the facility during day and night operations. The intent is to reduce the visible signature of the gate guard, as seen from the outside of the gate house, without reducing the ability of the gate guard to see out.
- A toilet and sink
- 360-degree visibility provided by clear line of sight (for a minimum of 180 degrees), mirrors, and other visual aid equipment
- Local Area Network (LAN), phone, and computer with Internet access
- Heat and air conditioning
- A UPS or auto start generator

- Storage for traffic cones and other supplies
- A weapons storage area
- A water faucet with hose bib on the outside of the building
- Security cameras that transmit information back to law enforcement desk and Central Security Control
- National Institute of Justice (NIJ) Level III Protection (7.62 Ballistic). The required physical security design features shall be determined in accordance with installation requirements and existing security engineering references such as MIL-HDBK 1013/1A or TM-853. Threats that may commonly be considered include forced entry and ballistic attack. MIL-HDBK 1013/10 specifies, as a minimum, that ballistic protection will be provided for a medium threat severity level. The threat severity level is equivalent to UL/ ANSI/ 752 Level 5 (SPSA). This protection will be a consideration in the design and construction of the exterior envelope including windows, doors, walls, and other equipment.
- Crash attenuation at the front of the gatehouse
- 152mm (6-inch) high curbs
- Remote control of the final barrier
- Interior dimmer lights

***Figure 4F.2– Visitors/DoD Personnel Gatehouse: Notional Layout***



### *Square Footage Table: Visitor/DoD Personnel Gatehouse*

| *Space Name* | *Area (NSF*)* | *Quantity* | *Comments* |
|---|---|---|---|
| ***Workstation*** | 48 | 2 | |
| ***Toilet*** | 24 | 1 | |
| ***Tele./Comm.*** | 10 | 1 | Size for anticipated technologies |
| ***Storage/Weapons*** | 10 | 1 | |
| **Total** | 92 | | |

* not including circulation or wall thickness

### *Finish Schedule: Visitor/DoD Personnel Gatehouse*

| *Space Name* | *Location* | *Description* |
|---|---|---|
| ***Workstation*** | *floor* | quarry tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Toilet*** | *floor* | quarry tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Tele./Comm.*** | *floor* | quarry tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Storage/Weapons*** | *floor* | sealed concrete |
| | *wall* | masonry (painted if necessary) |
| | *base* | none |
| | *ceiling* | acoustical ceiling tile |

### *Canopies*

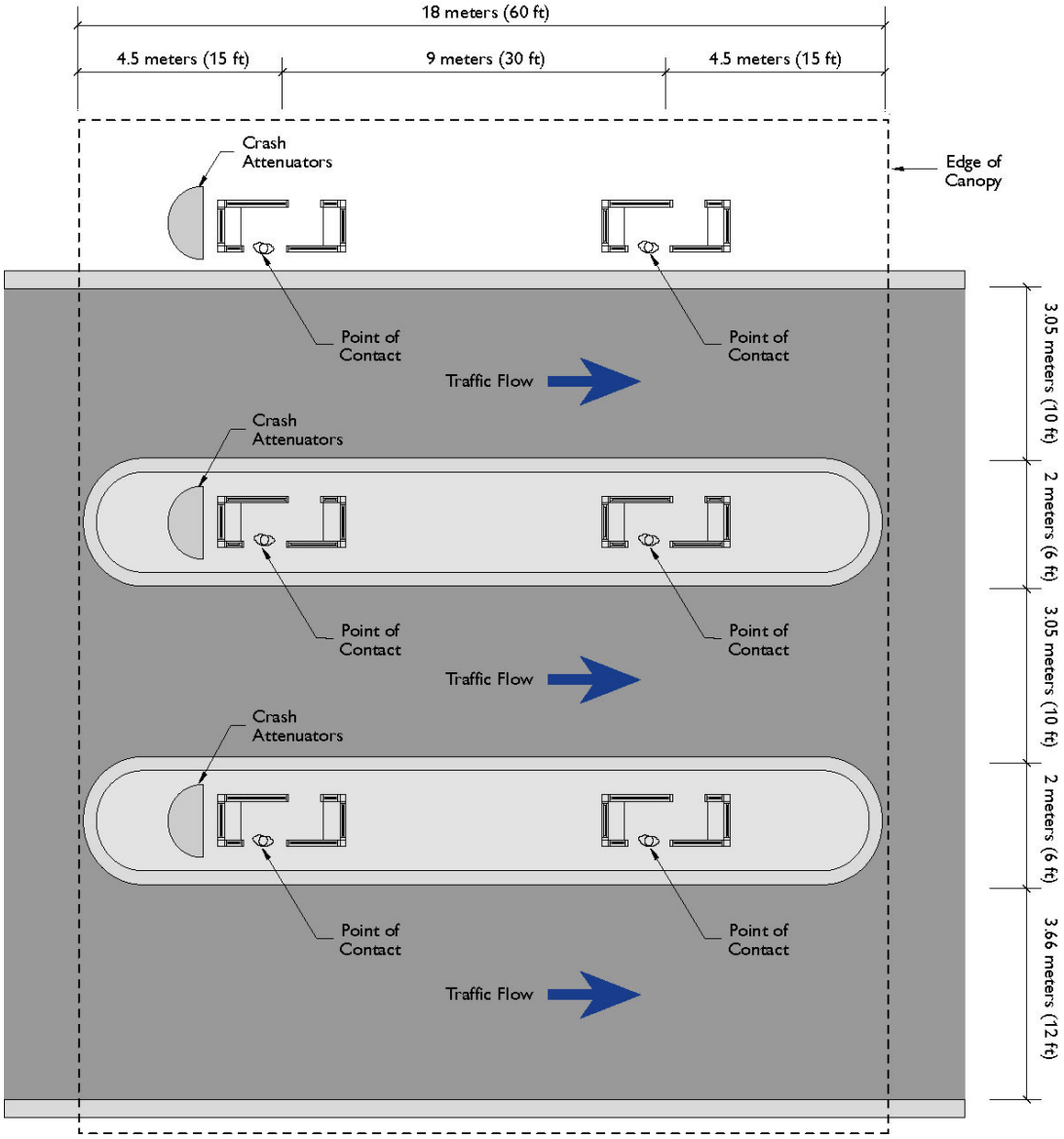
Canopies should be provided to protect the entry controllers from the elements and to provide a platform for area and task lighting. They should provide a minimum of 4.41 meters (14 ft 6 in) clear height for emergency response vehicle access. Fans or other type of air circulation device should be provided (if not provided for individual ID check stations). Canopy design should avoid the use of structural elements that could obstruct visibility for entry controllers.

Canopies should identify contextually with the architecture of the base. Architectural presentation at the ECF must reinforce existing installation architectural statement rather than introduce a new element that is simply compatible with the existing. The architecture of the canopy should be an understatement, not an overstatement.

### *ID Checking Station*

ID Checking Stations are provided for additional protection from the elements and approaching vehicles. In cold weather climates, a radiant heat source should be provided within these enclosures and extend to the covered area used by SF personnel to check IDs. Lower walls should be provided to withstand bullets in accordance with the National Institute of Justice (NIJ) Level III protection (7.62 Ballistic). Glazing should provide 360-degree visibility, and bulletproof glass should be installed at the front and sides. A shelf for temporary storage should also be provided. Design should allow easy and quick movement in and out of structure. Entry controllers should easily be able to approach vehicles for security checks and have two entry/exit points from their station.

***Figure 4F.3– Visitor/DoD Personnel ID Checking Stations: Notional Layout***




***Lighting***

The gatehouse/ ID check area must be adequately lighted. This includes transitional roadway lighting (see Fig 4B.1) in the vicinity of the facilities that provides an even distribution of light from a darker street-lit area to the ECF area. A general area light level of 20 foot-candles is adequate in the area underneath the canopy. Additional task lighting must be provided in the ID check area so that SF personnel can adequately identify vehicle operators. A light level of 30 foot-candles is required at the point of contact.

***Denial/Exit***

This area provides motorists denied access to the installation with an exit lane to outbound traffic lanes. This is essentially a U-turn area that should be large enough for large vehicles to turn around and enter the exit lanes. The exit lanes should be designed to deter an unauthorized inbound vehicle from bypassing entry control and gaining access to the installation. If this cannot be accomplished acceptably with traffic calming or lane separation techniques, a one-way deterrent device (i.e., tire shredder) should be considered.

***Commercial Vehicle Gatehouse/ID Check Area***

The gatehouse for commercial vehicles is located near the vehicle inspection area and provides a facility where SF personnel can process driver credentials. There will also be an area in the gatehouse where drivers can wait during vehicle inspection or for base escorts. While SF entry controllers in the facility are not specifically tasked with visual surveillance of areas outside the facility, they should be provided as much visibility as possible of the inspection and gate areas. The driver waiting area should be configured so that drivers cannot directly observe the inspection process.

***Design Criteria***

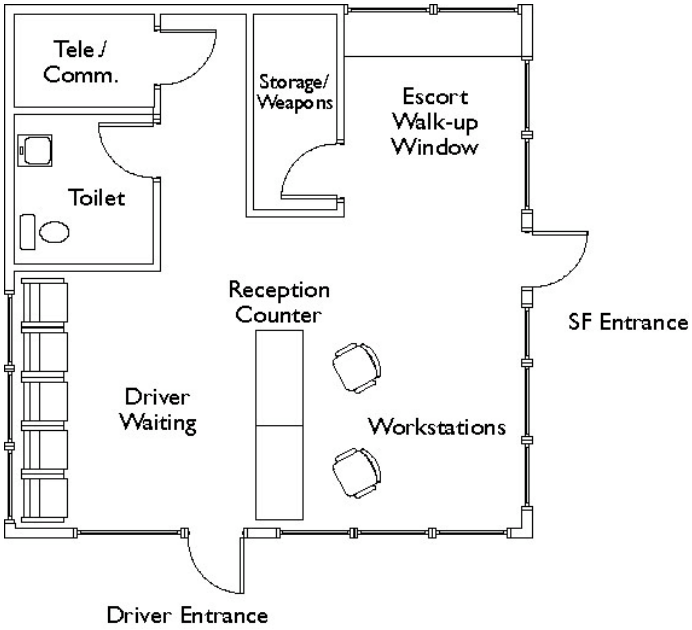
Commercial vehicle gatehouse designs should have the following features:

- Accommodate three to five SF personnel
- Limited view window glass—windows should limit viewing into the facility to the extent possible without restricting viewing out of the facility during day and night operations
- A toilet and sink
- Waiting area for truck drivers
- Check-in window for escorts
- 360-degree visibility provided by clear line of sight (for a minimum of 180 degrees) mirrors, and other visual aid equipment
- A clear line of sight to the inspection area
- Local area network (LAN), phone, and computer with Internet access
- Heat and air conditioning
- A UPS or an auto-start generator
- Storage for traffic cones and other supplies
- A weapons storage area
- A water faucet with hose bib on the outside of the building
- Security cameras that transmit information back to law enforcement and Central Security Control
- National Institute of Justice (NIJ) Level III Protection (7.62 Ballistic) (NIJ Standard 0108.01). The required physical security design features shall be determined in accordance with installation requirements and existing security engineering references such as MIL-HDBK 1013/1A or TM-853. Threats that may commonly be considered include forced entry and ballistic attack. MIL-HDBK 1013/10 specifies, as a minimum, that ballistic protection will be provided for a medium threat severity level. The threat severity level is equivalent to UL/

ANSI/ 752 Level 5 (SPSA). This protection will be a consideration in the design and construction of the exterior envelope including windows, doors, walls, and other equipment.

- Consider military working dog rest/relief requirements

***Figure 4F.4– Commercial Vehicle Gatehouse: Notional Layout***




***Square Footage Table: Commercial Vehicle Gatehouse***

| *Space Name* | *Area (NSF*)* | *Quantity* | *Comments* |
|---|---|---|---|
| ***Workstations*** | 150 | 2 | Planning Factor: 75 NSF per workstation |
| ***Toilet*** | 40 | 1 | |
| ***Tele./Comm.*** | 40 | 1 | |
| ***Escort Walk-up*** | 50 | 1 | |
| ***Storage/Weapons*** | 50 | 1 | |
| ***Driver Waiting*** | 75 | 1 | Planning Factor: 15 NSF per driver chair |
| **Total** | 405 | | |

* not including circulation or wall thickness

***Finish Schedule: Commercial Vehicle Gatehouse***

| *Space Name* | *Location* | *Description* |
|---|---|---|
| ***Workstations*** | *floor* | vinyl tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Toilet*** | *floor* | vinyl tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Tele./Comm.*** | *floor* | sealed concrete |
| | *wall* | masonry (painted if necessary) |
| | *base* | none |
| | *ceiling* | acoustical ceiling tile |
| ***Escort Walk-up*** | *floor* | vinyl tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |
| ***Storage/Weapons*** | *floor* | sealed concrete |
| | *wall* | masonry (painted if necessary) |
| | *base* | none |
| | *ceiling* | acoustical ceiling tile |
| ***Driver Waiting*** | *floor* | vinyl tile |
| | *wall* | masonry (painted if necessary) |
| | *base* | rubber |
| | *ceiling* | acoustical ceiling tile |

### 4G - Pull-off/Alternate Inspection Area

There should be a pull-off area for vehicles just beyond the ID check area and gatehouse where alternate inspections can be conducted, ID discrepancies addressed or driver's questions answered. There should also be a pull-off area on the exit lane where vehicle inspections can be conducted.

#### *Design Criteria*

The pull-off /alternate inspection area should accommodate one to three parallel-parked without impeding the direct flow of traffic. A pull-off area should be provided on both sides of the entry drive so that vehicles do not have to cross the flow of traffic to pull over.

### 4H - Roadway Containment

Roadway containment is necessary to prevent inbound vehicles from unauthorized access and must extend from the gatehouse/ID check area to the final barrier. Containment may consist of either natural or constructed barriers. Natural barriers may be a dense tree stand, berms, or drainage ditches on either side of the roadway. Berms and ditches must

be extreme enough to make it very difficult for a vehicle to cross them. Constructed containment includes high curbing and vehicle control fencing (e.g. cable or W-beam guard rail).

**4I - Final Barrier**

The purpose of the final denial barrier is to stop unauthorized vehicles from entering the installation. Most individuals who attempt to enter the installation without authorization are lost, confused, or inattentive, but there are also those whose intent is to "run the gate." A properly designed final denial barrier will take into account both groups, safely stopping the individuals who have made an honest mistake and providing a properly designed barrier (based on locally postulated threat vehicle) to stop those with hostile intentions.

***Design Criteria***

The final barrier system—device, location, and controls—should be designed to allow an adequate SF response to all types of intruders. Appropriate signage and median crossings should redirect most "casual intruders." Warning lights along the roadway and at an active barrier should be provided to safely stop vehicles before they reach the final barrier in the event the entry controller or overwatch needs to activate or raise the barrier. Detection loops embedded in the roadway leading up to the active barrier should be installed to interrupt barrier activation when a vehicle is over the barrier. To address hostile intruders, incorporating appropriate traffic calming in the site layout will allow the barrier design to focus on a scenario in which a vehicle does not have the opportunity to achieve high velocity between the ID check and (potential) barrier position. This provides maximum flexibility in barrier placement if only a short distance is available between the ID check and Overwatch.

The barrier system must be designed to impede both inbound and outbound vehicles. The system should include traffic control features to deter inbound vehicles from using outbound lanes for unauthorized access or at least to keep them from reaching high speeds in outbound lanes. Barrier devices that traverse both roadways should therefore be included in the design. The safety features discussed above for inbound lanes should also be provided in the outbound lanes as they approach the barrier from the installation interior.

MIL-HDBK-1013/14 provides guidance for determining appropriate barrier placement based on the activation time for various systems and the response time needed for a given scenario. For example, to stop a high-performance vehicle that accelerates from a stop at the ID check, and given an 8 second response time, an active barrier should be placed approximately 110 meters (360 ft) down the roadway. Using this reference material as a starting point, the designer should consult with SF regarding the layout and design of the final barrier system. A list of certified anti-ram vehicle barriers is available via the State Department acquisition Web site at http://www.statebuy.gov/compadcertbarriers.htm.

## 4J – Overwatch Position

***Visitor/DoD Personnel Overwatch Position***
The overwatch position is located proximate to the final barrier to facilitate SF response to a "gate runner" vehicle. When SF entry controllers notify the Overwatch of an unauthorized entry, the Overwatch reacts to stop the vehicle before it reaches the final barrier.

***Design Criteria***
An asphalt or otherwise paved pad should be provided at the overwatch location, to accommodate an SF vehicle or temporary facility during increased FPCONs. A utilities/communications stub should be provided for this facility. If manpower is authorized and funded for the overwatch position, a small (approximately 1.2 x 1.8 meters or 4 ft x 6 ft) permanent facility may be constructed. Provide the following in the overwatch facility:

- heat and/or air conditioning
- electrical outlet
- telephone
- writing/desk surface
- 360-degree visibility from both a sitting and standing position
- barrier device controls

***Commercial Vehicle Overwatch Position***
Leaving the installation access gate closed until the commercial vehicle clears inspection provides security overwatch for the commercial vehicle gate area.

***Design Criteria***
If the installation access gate is not crash rated, an active barrier should also be provided. Remote control of this gate and/or crash barrier should be located at the commercial vehicle gatehouse or inspection area.

## 4K – Other Design Considerations

***Building Code and Accessibility Considerations***
All AF facilities, regardless of location, must comply with applicable DoD, AF construction standards and the International Building Code. In the event of a conflict between AF standards and local building codes, the more stringent requirement shall apply. Incorporate host nation requirements and coordinate designs with local and state infrastructure standards where there is an interface with public facilities (roadways, etc).

AF facilities that are to be accessible to the public must be designed to be accessed and used by persons with disabilities, unless it is clearly documented that only able-bodied military personnel will occupy the facility. Therefore, new construction and alterations to existing Visitors Centers and Commercial Vehicle Gatehouses must comply with

ADAAG and Uniform Federal Accessibility Standards (UFAS). The most stringent standards shall apply in the event of conflicts.

***Sustainable Design***
Consult the AF Sustainable Design Guide for requirements regarding sustainable design.

***Utilities and Services***
The following matrix depicts the utilities and services that must be provided at each ECF element.

| | Telecom | LAN | Video/ CCTV | Cable TV | Power | Plumbing | HVAC |
|---|---|---|---|---|---|---|---|
| Gatehouses | — | — | — | | — | — | — |
| Inspection Areas | — | — | — | | — | — | — |
| Smart Gate Technology | | — | — | | — | | |
| Visitors Center | — | — | | — | — | — | — |
| Overwatch Facilities (if provided) | * As Required | | | | — | | — |

* If required by MAJCOM

Frequently, new underground utilities for existing site elements must be placed within the right-of-way. New security systems and technology must also be installed. Such construction can disrupt traffic and interfere with the function of the ECF and thus pose a security risk. This can be a significant problem at an ECF that is frequently one of the most congested and critical areas on an installation, but for security reasons often has poor or no alternative routings. To minimize the problem posed by such construction, future requirements should be anticipated in the design of ECFs. For example, when installing a conduit bank, an extra conduit for future use can be installed at a fraction of the cost to demolish the road for later installation. Utilities should be located underground to improve the appearance of the installation entrance.

***Mechanical, Structural and Plumbing Considerations***

- Design facilities to meet the federal agency energy conservation standards defined in the Air Force Engineering Technical Letters (ETL) 94-4 and Energy Usage for Facilities in the Military Construction Program documents
- Design mechanical systems according to American Society of Heating/Refrigeration and Air Conditioning Engineers (ASHRAE) standards
- Provide hookups for the installation's energy monitoring and control system (EMCS), if applicable

- Provide domestic water and sanitary systems in accordance with the National Plumbing Code
- Provide hot and cold water to all toilet rooms, janitor's closets, and sinks

***Fire Protection***

Construct the facilities to meet the requirements of Military Handbook (MIL-HDBK) 1008. This handbook contains information regarding fire protection and life safety feature requirements, construction details, fire detection/suppression systems, and egress components.

***Communications***

The installation's Communications function can provide details regarding the communications requirements and the design of the ECF's internal and external phone and data connectivity systems.

# CHAPTER 5 –REFERENCE DOCUMENTS

**Air Force**

AFI 10-245 Air Force Antiterrorism (AT) Standards,
http://www.e-publishing.af.mil/pubfiles/af/10/afi10-245/afi10-245.pdf
AFI 31-101, *The Air Force Installation Security Program* (FOUO)
AFI 31-203, *Security Forces Management Information System (SFMIS),*
http://www.e-publishing.af.mil/pubfiles/af/31/afi31-203/afi31-203.pdf
AFMAN 32-1071, Vol 1, *Security Engineering Project Development* (FOUO)
AFMAN 32-1071, Vol 2, *Security Engineering Concept Design* (FOUO)
AFMAN 32-1071, Vol 3, *Security Engineering Final Design* (FOUO)
ETL 94-4, *Energy Usage Criteria for Facilities in the Military Construction Program*,
http://www.afcesa.af.mil/Publications/ETLs/ETL%2094-4.pdf
*Achieving Design Excellence* brochure,
http://www.afcee.brooks.af.mil/dc/DCD/arch/designbrochure/DEsinglepg.pdf
http://www.afcee.brooks.af.mil/dc/DCD/arch/designbrochure/DEconve.pdf
*Force Protection Design Guide*, http://www.afcee.brooks.af.mil/dc/dcd/arch/force.pdf
*Air Force Architectural Compatibility Design Guide*,
http://www.afcee.brooks.af.mil/dc/dcd/arch/ACguide/liveACG/index.htm
*USAF Landscape Design Guide*,
http://www.afcee.brooks.af.mil/dc/dcd/land/ldg/index.html
USAF symbol guidelines,
http://www.af.mil/airforcestory/guidelines.shtml

**Unified Facilities Criteria**

UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*,
http://www.hnd.usace.army.mil/techinfo/ufc/ufc4-010-01.pdf
UFC 4-010-10, *DoD Minimum Antiterrorism Standoff Distances for Buildings* (FOUO),
http://www.hnd.usace.army.mil/techinfo/ufc/ufc4-010-10-FOUO-extract.pdf
AFPAM 32-1097, AF Sign Standards (UFC 3-120-01, *Air Force Sign Standards*)

**Military Handbooks**

MIL-HDBK-1008C, *Fire Protection for Facilities Engineering, Design, and Construction*,
http://www.efdlant.navfac.navy.mil/lantops_15/documents/MH/1008C.PDF
MIL-HDBK 1013/1A, *Design Guidelines for Physical Security of Facilities* (FOUO)
MIL-HDBK 1013/10, *Design Guidelines for Security Fencing, Gates, Barriers and Guard Facilities* (FOUO)
MIL-HDBK 1013/14, *Selection and Application of Vehicle Barriers* (FOUO)

**Department of Defense**

DOD Directive 0-2000.12-H (Draft), *DoD Antiterrorism/Force Protection Program*, 2 Oct 00, http://www.dtic.mil/whs/directives/
DOD Instruction (DoDI) 2000.16, *DoD Antiterrorism Standards*,
http://www.dtic.mil/whs/directives/

**The Access Board**
ADA Accessibility Guidelines for Buildings and Facilities,
http://www.access-board.gov/adaag/html/adaag.htm
Uniform Federal Accessibility Standards,
http://www.access-board.gov/ufas/ufas-html/ufas.htm

**Federal Highway Administration**
*Manual of Uniform Traffic Control Devices* (MUTCD),
http://mutcd.fhwa.dot.gov/

**Department of Justice**
NIJ Standard 0108.01, *Ballistic Resistance of Protective Materials*,
http://www.ojp.usdoj.gov/nij/

**Army**
TM 5-853-1 thru 4
MTMCTEA Pamphlet 55-10, *Traffic Engineering for Better Roads*,
http://www.tea.army.mil/cdrom/readmes/reference.htm
MTMCTEA Pamphlet 55-15, *Traffic Engineering for Better Gates*,
http://www.tea.army.mil/cdrom/readmes/reference.htm
MTMC Traffic Engineering & Highway Safety Bulletin August 2001,
http://www.tea.army.mil/cdrom/readmes/reference.htm

**Industry Codes and Standards**
UL/ANSI Std 752, *Standard for Bullet-Resisting Equipment*,
http://www.comm-2000.com/ULstandard5B.asp?standardno=752
BOCA National Plumbing Code, http://www.bocai.org/codes.asp
BOCA International Building Code (IBC), http://www.bocai.org/codes.asp
ASHRAE Standards, http://resourcecenter.ashrae.org/store/ashrae/