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PLANNING AND DESIGN OF EXPEDITIONARY AIRBASES

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This volume provides deployment information to allow civil engineers and logistics planners to plan for, design, establish and sustain expeditionary airbases. When used in conjunction with Volume 5 of this pamphlet series, theater and wing planners, advance echelon (ADVON) team members and deploying expeditionary engineers will have the basic tools required to identify and employ consistent standards across the service components for infrastructure development, security and sustainment support for expeditionary bases. This volume is not intended to provide a definitive design or layout applicable for every type of deployment. It is intended to provide theplanning criteria and background necessary to: (1) Determine what facilities are required to support Air Force, Joint and Coalition deployments supporting Aerospace Expeditionary Force (AEF) missions; (2) Identify forces, equipment and resources required to provide adequate support facilities; (3) Understand the factors that affect transition between initial and temporary standards; (4) Sustain facility operations through redeployment and reconstitution. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 37-123, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule located at **https://webrims.amc.af.mil**.

Chapter 1

INTRODUCTION

1.1. References, Abbreviations, Acronyms and Terms. Related publications, abbreviations, acronyms and terms used in this volume are listed in **Attachment 1**.

Figure 1.1. Southwest Asia Bare Base Support Facilities.

1.2. Purpose. This volume was developed to provide deployment information, which will allow engineers and logistic planners to plan for, design, establish and sustain Aerospace Expeditionary Force airbases. When used in conjunction with Volume 5 of this series, theater and wing planners, advance echelon (ADVON) team members and deploying units' expeditionary engineers will have the basic tools required to identify and employ consistent standards and expectations across the service components for infrastructure development, security and sustainment support for expeditionary bases. This volume is not intended to provide a definitive design or layout applicable for every type of deployment. Rather, it is intended to provide the planning criteria and background necessary to:

1.2.1. Determine what facilities are required to support Air Force and joint service deployments conducted for Aerospace Expeditionary Forces operations.

1.2.2. Identify what forces, equipment and resources are required to provide adequate support facilities.

1.2.3. Understand the factors that affect transition between initial and temporary standards.

1.2.4. Sustain facility operations within conditions that require a range from austere to initial to temporary standard.

1.3. Scope. The materials in this volume are most helpful when used as an update to bare base planning. It updates bare base planning criteria to consider various Expeditionary Aerospace Force (EAF) deployment strategies used to support theater of operations (TO) locations. It provides: planning, design, layout and construction considerations based on force deployment; additional information on deployment timelines; expected facility requirements along the timeline; information on tailoring of forces and support packages; and lessons learned based approaches to sustaining facilities and utilities.

1.4. Background. Prior to 1989, the Air Force was postured against one primary threat, the Soviet Union. Much of our force was forward deployed and if called to fight, would do so from home base or would deploy to a well-established, permanently manned facility. While our mobility forces deployed in support of humanitarian operations, our combat forces generally did not deploy away from well-established bases.

Figure 1.2. 1980s Cold War Overseas Basing.

1.4.1. As permanent forward basing was lost, more rapidly deployable, U.S.-based forces were required to assume greater responsibilities to support operations. The ability to project power quickly across the globe was becoming more of a requirement. In the 1990s, while the number of Air Force wings and personnel were being reduced, the requirements for support of operations abroad were increasing.

1.4.2. Since the Gulf War, deployment of both combat and support forces has increasingly been to more austere forward locations – this has become a way of life for the Air Force. The Air Force stood up numerous expeditionary bases in much the same way that the Navy and Marines approached expeditionary basing. This approach to deployments led to the Air Force reorganizing under the Expeditionary Aerospace Force construct in January 2000. To support the EAF construct, Aerospace Expeditionary Forces (AEFs) are formed that operationally link geographically separated units into ten AEFs, each with a designated leadwing. There are also five mobility lead wings designated to provide global mobility and a constant flow of vital supplies, equipment and other resources from the United States and allied nations into a theater of operations.

Figure 1.3. Permanent Overseas Basing in 2005.

Figure 1.4. Overseas Basing Supporting Global War on Terrorism – 2005.

1.4.3. This publication provides guidance for planning and development of expeditionary airfields that support associated missions in accordance with Joint Publication 4-04, *Joint Doctrine for Civil Engineering Support*. This publication also addresses expeditionary airfield development planning for the orderly and efficient management, development of land, facilities and infrastructure. The goal is to take the intent and guidance of Air Force and joint infrastructure and installation regulations and apply

them to expeditionary operations. This publication is not intended to address all aspects of expeditionary airfield planning. For instance, the combatant commander specifies the construction standards for expeditionary facilities under his responsibility. These standards are established to ensure that projects support the commander's intent and concept of operations.

Figure 1.5. Air Force 2005 World Wide Deployed Presence.

1.5. Base and Construction Standard Terminology and Definitions. Within expeditionary and long-term operations, there are four types of base camps: forward op erating locations (FOL), forward operating base (FOB), main operating base (MOB) and intermediate staging base (ISB).

Figure 1.6. Main Operating Bases in Southwest Asia.

1.6. Planning for Initial Standard Expeditionary Airbases. Today's EAF mobility concept of "light, lean and lethal" requires rapid deployment. An AEF wing, group, squadron or unit may deploy to an austere bare base location that has a runway, taxiways, parking ramp and a source of water that can be made potable. The deployment has often been accomplished with smaller, tailored Unit Type Code (UTC) packages and with a mix of aircraft. An austere forward airbase's runway, taxiways and parking ramp may not

be adequate to meet the requirement for all planned deployed forces; additional engineering forces, such as the Air Force's Rapid Engineer Deployable Heavy Operations Response Squadron Engineers (RED HORSE), or the Navy's Construction Battalions (CBs or Seabees) or Army Combat Heavy Engineers, may be required to provide repairs, upgrading and/or expansion to allow full, planned mission use. The location may also have limited vertical facilities and utilities that can be used, but may have to be repaired prior to occupancy for its final intended purpose. Many locations may have to rely on air mobility for most or all support. Besides having to use tailored UTC packages for aircraft and personnel, support packages may have to be further tailored to make them lighter. Some support operations may have to initially exist as austere, while waiting for resource and logistics capability to robust facilities. Engineers at austere locations need to plan for increased reliance on expedient expeditionary construction techniques to ensure mission accomplishments while waiting for upgrades. Developmental delays are usually related to early-on, airlift-only logistics support for the forward location being dedicated to joint operational support of other services, such as Army and Marine units and special operations forces. Expedient facilities may be the fill-in method for operating in initial austere locations. Guidance on expedient engineering methods can be found in AFPAM 10-219, Volume 7, *Expedient Construction Methods.*

Chapter 2

AIR EXPEDITIONARY FORCE BARE BASE PLANNING AND DEVELOPMENT

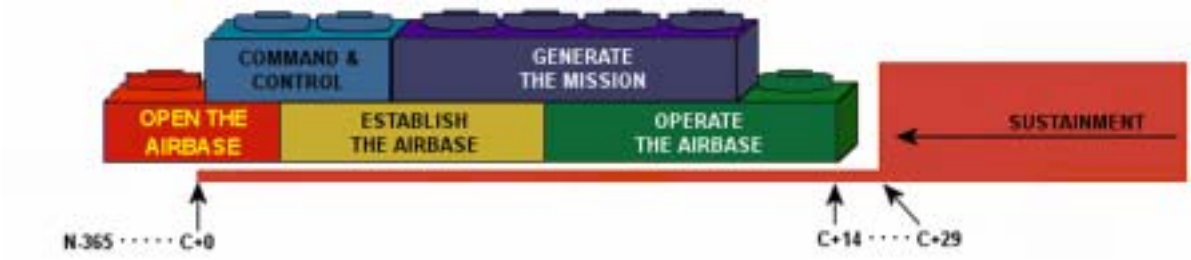
2.1. Overview. During the last decade of the Twentieth Century, the US military witnessed many transitions: an end to the Cold War, semi-permanent overseas basing with stateside reinforcement; Operation DESERT SHIELD prepositioning along with mass transportation and large scale deployment; low intensity conflicts ruled by geopolitical diplomacy and limited military forces; joint and coalition peacekeeping forces; deployments for military actions other than war; and EAF operations to support rapid, global deployment. Operation DESERT SHIELD is considered a classic case for large-scale joint deployment and Global Reach-Global Power force projection to bare bases. Still, DESERT STORM demonstrated that there were many expeditionary combat support issues to be resolved to improve global deployments. Rapid and continually evolving operational and beddown requirements during Operation ENDURING FREEDOM (OEF) and Operation IRAQI FREEDOM (OIF) drove the Air Force to the Air Expeditionary Task Force (AETF) force module concept of operations. This concept provides clearer planning guidance for opening and establishing airbases in an expeditionary environment. Engineering planners must consider GMTF CONOPS, mission requirements, climate, host nation capabilities, anticipated operational duration and airfield and facilities conditions during all phases of the five force modules.

Figure 2.1. Tent City during Operation ENDURING FREEDOM.

2.2. AETF Force Modules. Force modules provide the framework to systematically present capability to rapidly open an airfield, establish operational capability and conduct air operations thereafter. A force module is defined as a grouping of combat and expeditionary combat support UTCs with accompanied supplies and required non-unit resupply and personnel necessary to sustain forces for a minimum of 30 days. Elements of force modules are linked together or are uniquely identified so that they may be extracted from or adjusted as an entity in the Joint Operations Planning and Execution System (JOPES) databases to enhance flexibility and usefulness of the operations planning and execution process. Force modules provide planners a simple methodology for matching specific personnel and equipment for specific mission requirements.

2.3. Force Modules. Force modules help standardize the planning and execution of how forces are employed and ensure a repeatable and effective process. The five force modules are *open the airbase*, *command and control*, *establish the airbase*, *generate the mission* and *operate the airbase*. **Figure 2.2.** provides a graphic representation of force module deployment.

Figure 2.2. AETF Force Module Phased Deployment.



2.3.1. *Open the Airbase*. This force module will normally arrive first and assess the airbase for establishment of airfield operating parameters, command and control and supporting host-nation support capabilities. It contains a small force (150 personnel) to provide the capability for: command and control, force protection, cargo and passenger handling, logistics, communications, airfield operations and establishing minimum operating strip, force accountability and reception and beddown of follow-on modules. The capabilities in the module should rapidly establish an initial operating capability (IOC) in approximately 36 hours from arrival of forces.

2.3.1.1. This module contains capabilities to open an airbase regardless of the follow-on mission support requirements for a specific mission, airframe or weapons system.

2.3.1.2. *Open the airbase* forces will also provide the capability to plan the layout for follow-on airbase infrastructure. These forces may be supporting other service components or coalition allies. Operations may be flying or non-flying, combat or non-combat or any combination thereof. This module will most likely deploy in the C minus timeframe. Some portions of this module may depart when the airfield is minimally capable of supporting the follow-on forces. As the forces assigned to this module are completing their mission, forces from *establish the airbase* module are assuming their responsibilities in addition to extending the airfield's existing capabilities.

2.3.2. *Command and Control* (*C2*). The *C2* module contains the capabilities to establish an air expeditionary wing command and control structure and is estimated to be at IOC in approximately 16 hours after arrival of forces. This module assumes command of the airbase from the initial elements of the *open the airbase* module and establishes permanent secure and non-secure communications capabilities.

2.3.2.1. This module contains the capabilities to establish initial maintenance group, mission support group, operations group and medical group staffs. This initial capability will be rounded out once the *establish the airbase* and *operate the airbase* modules arrive. Secure communications and intelligence are key capabilities to establishing control.

2.3.2.2. This module begins at some point on or after C-0 and must be in place **prior** to any command elements leaving from the *open the airbase* force module.

2.3.3. *Establish the Airbase*. This module contains the capabilities to support most missions or weapon systems. Together with the *open* and *generate* modules, it provides the airfield's earliest capability to execute its assigned mission.

2.3.3.1. The *establish the airbase* module will provide capabilities to build and modify existing and deployed infrastructure (petroleum, oils and lubricants (POL), munitions storage and operating sites, maintenance shelters, tents, electrical), command and control mission specific forces, expand to 24-hour day/night mission operations, enhance force protections, communications and airbase operations as necessary. This module initiates on or after C-0 and overlaps the efforts of the *open* module. The effectiveness of this module is dependent upon integration with *open the airbase* and *generate the mission* modules. The module is estimated to be at IOC in approximately 10 days.

2.3.3.2. This module contains forces that increase expeditionary airfield capabilities to support expanded and sustainment operations. This includes: lodging, finance, aerial port, infrastructure, emergency response (fire crash rescue, medical, security forces, safety and EOD), personnel support for contingency operations (PERSCO) and communications.

2.3.4. *Generate the Mission*. This force module contains the capabilities to conduct the desired military and mission effects required by the combatant commander. This module combines two subordinate force modules: a Core UTC package (CUP) and a mission platform package. The CUPs contain the lead aviation package and direct aviation support (e.g. maintenance, munitions, etc) associated with the aviation capability. CUP titles usually identify the type of aircraft deployed. The mission platform package contains combat support capabilities that support the aviation package (e.g. weather, intelligence, operations support, maintenance supervision and communications).

2.3.4.1. The mission support elements of this forcemodule may begin to flow before C+0 day and will overlap the *open* and *establish* modules. Mission generation is not achievable without integration of *open*, *C2* and *establish* modules. This module is intended to conduct operations within 36 hours of initial arrival and will be at IOC in approximately 80 hours from the start of the *open the airbase* module.

2.3.4.2. The ability of this force module to reach IOC is heavily dependent on the strategic flow of resources and the deployment of mission aircraft and operators.

2.3.5. *Operate the Airbase*. This module contains the mission support capabilities needed to achieve full operating capability. Forces in this module make initial operating capabilities more robust and can sustain mission generation forces for up to 30 days.

2.3.5.1. The module provides capabilities to enhance force protection, cargo handling, quality of life activities (chaplain, fitness, library, health care, feeding and sheltering) and reach-back capabilities (supply, U.S. mail, military pay). This module begins to flow on or after C+2 and reaches closure on or before day C+14. The module is estimated to be at IOC approximately 7 days from arrival.

2.3.5.2. The *operate the airbase* module begins the transition from austere and initial construction standards to temporary construction standards as directed by mission duration and combatant commander requirements.

2.4. Bare Base Terminology, Definitions and Types. A bare base is defined as a location with a functional runway, taxiway, parking areas and a source of water that can be made potable. The location was

chosen to make the base capable of supporting all assigned and supporting aircraft and provide mission essential resources in a timely and combat effective manner. These resources would include logistical support and service to the infrastructure composed of people, facilities, equipment and supplies. This bare base concept requires prepackaged mobile facilities, utilities and support equipment that can be rapidly deployed and installed. Expeditionary airbases are defined by the level of infrastructure, development, operational duration and missions that are present or will be deployed to the area. By combining the type of airbase with the outlined facilities standards listed later in this chapter, the CE planner can greatly reduce the time required to identify, validate and source requirements for various locations. The various types of expeditionary airfields include forward operating location, forward operating base, main operating base, intermediate staging area and warm base.

2.4.1. Forward Operating Location (FOL). FOLs are airfields utilized for short-term, operationally defined missions such as counter-drug or combat search and rescue (CSAR) and have very limited facilities and amenities. A FOL is normally an austere location requiring very little engineering effort to execute mission requirements.

2.4.2. Forward Operating Base (FOB). FOBs are airfields used to support tactical, CSAR and reconnaissance operations without establishing full support facilities. FOBs may be used for an extended duration. Support by a main operating base will be required to provide backup support for a forward operating base.

2.4.3. Main Operating Base (MOB). Main operating bases are normally occupied by a wing or larger population (550 personnel or more), are continuously operated and posses in-place Air Expeditionary Wing (AEW) command structures, robust expeditionary combat support (ECS) and logistics functions.

2.4.4. Intermediate Staging Base (ISB). An ISB is a location or airfield used to stage forces prior to inserting combat forces into the forward theater of operations. During OIF, the US Army utilized Doha, Kuwait as a staging and positioning area for the 4th Infantry Division prior to the initiation of combat operations in Iraq. ISBs have large transient cargo and personnel requirements and normally require greater planning factors for cargo ramps and ECS to accommodate large throughput of assets.

2.4.5. Warm Base. A warm base is defined as a prepositioned location where initial beddown infrastructure development and prepositioning of assets has occurred that allow for the rapid deployment of personnel and weapons systems to an expeditionary location. During OEF and OIF, the Air Force heated up bases at Masirah Island, Al Udeid, Seeb and Thumrait to enable the rapid mobilization of hundreds of aircraft and thousands of personnel.

2.5. Construction Standards Definitions and Terminology. The combatant commander specifies the construction standards for all facilities in theater. These standards are established to ensure that facilities meet mission requirements while minimizing the engineering effort expended for planning and standardize quality of life throughout the theater of operation. The following definitions expand those established in JP 4-04 and define the construction standards of bare bases and their minimum facility requirements.

2.5.1. Expeditionary Standard Airbase. An expeditionary standard airbase is a subset of the initial standard defined in **Chapter 1**. They are designed and constructed on an expedient basis, using organic and service provided equipment and systems and/or host nation resources to support mission durations of up to 90 days. Focus will be on providing support, facilities and infrastructure systems

necessary to move, receive and beddown deploying forces. Expeditionary standards would be seen at short term FOL and FOB locations.

2.5.2. Initial Standard Airbase. An initial standard airbase is designed and constructed on an expedient basis and is characterized by austere facilities requiring minimal engineering effort to initiate mission operations. They are intended for use by operational units upon arrival in theater for a limited time ranging up to 6 months. Initial standard facilities may require replacement by more substantial or durable facilities during the course of operations. The Air Force developed BEAR kits to support initial standard expeditionary airbase deployments. Initial standards would most likely be seen at FOL, FOB and initial operations at MOB and ISB locations.

Figure 2.3. Initial Construction Standard at FOB in Afghanistan.

2.5.3. Temporary Standard Airbase. For deployments that are expected to last up to 24 months and where Military Construction Program permanent facilities (or even semi-permanent facilities) are not required, temporary standard facilities should be programmed. Temporary standards are characterized by minimum facilities requiring additional engineering effort above that required for initial standards. Temporary standard airbases provide for sustained operations above the requirements of initial standards at locations where a long-term presence is not anticipated. The temporary standards may be used from the start of an operation or as an upgrade from initial standards, if directed by the Combatant Commander for mission requirements. Temporary standards should increase the efficiency of operation, safety, durability, morale and health standards for deployed personnel. For command and critical facilities, modular and/or K-Span style facilities can be constructed with buried water lines, overhead and/or buried electrical distribution, lighting on poles, buried sewer lines, collection tanks and pumping systems. Dormitories and some administrative functions may receive hard floors and walls, or be upgraded or replaced with modular facilities as base growth and mission duration require. General requirements are found within Joint Chief of Staff guidance and are depicted in **Figure 2.4.** Theater commanders may vary standards as the situation, forces and location dictates.

Figure 2.4. Temporary Construction Standards for Lodging.

2.5.4. Enduring Presence Construction Standard. For deployments that are anticipated to last longer than two but less than 10 years, semi-permanent standards should be planned, programmed and executed. Semi-permanent standards are designed and constructed with finishes; materials and systems selected for moderate energy efficiency; maintenance and life cycle costs. Semi-permanent construction standards may be utilized as initial beddown standards when directed by the component combatant commander. Semi-permanent construction projects may exceed local base civil engineer and wing authority levels.

2.5.4.1. CE planners must be extremely knowledgeable about AF programming, funding and authority levels when planning for semi-permanent locations. Ensure proper coordination with theater level CE planners and MAJCOM CE program directorates prior to initiating any large-scale construction.

2.5.4.2. Enduring presence construction standards are normally set by agreements between the host nation and the United States and may include permanent or semi-permanent construction standards. These agreements will often outline conditions and standards the US military must adhere to while constructing on host nation property as well as cost sharing initiatives that may be put in place to alleviate the expense to US operations. Semi-permanent airbases should be constructed with a prime emphasis on sustainment and survivability.

2.5.5. Warm Base Standards. Warm bases are designed and constructed with finishes, materials and systems selected for sustaining a mobilization base within the theater of operations. A warm base may be a separate facility with a contract caretaker function or a surge area collocated with an operating base. Warm bases are positioned to be rapidly heated up through execution of task order contract line items in the contractor caretaker contract. Current AF policy dictates that CE UTCs be deployed to augment the contractor to ensure base camp is erected to US standards.

2.6. Expeditionary Airbase Development and Planning Process. The airbase development process has four main components: antiterrorism and force protection, facility requirements, master planning and construction management.

2.6.1. Antiterrorism and Force Protection (AT/FP). AT/FP and physical security concerns are critical to the development of expeditionary airbases and long-term military camps. Incorporating AT/FP requirements into site planning, selection, and layout is a critical and often difficult process. It is essential that CE and Security Forces planners work together to establish a realistic and executable

AT/FP plan to protect US personnel and AF assets. This partnership will ensure that the AT/FP plan is an integrated design consistent with the airbase initial and long-range development plans.

2.6.1.1. Essential to the base camp planning effort is the early identification of the AT/FP requirements. Addressing AT/FP concerns early helps to ensure that site location and layout is compatible with FP operations and mission accomplishment. Early development of AT/FP and physical security requirements also helps to reduce both construction and manpower costs. It is easier and more cost effective to establish security measures during the planning process than it is to apply AT/FP and physical security requirements, after the fact. AT/FP measures must be considered and included at all stages of beddown planning and base development.

2.6.1.2. IAW DOD Instruction 2000.16 (*DOD Antiterrorism Standards*) and DOD 2000.12H (*DOD Antiterrorism Handbook*) standards for construction of new facilities have been developed to counter possible terrorist threats. These construction standards have specific requirements for such measures as standoff distance, perimeter barriers and building construction. These minimum standards must be incorporated into the construction of all facilities regardless of the identified threat. Planners must ensure that they reference command specific publications regarding force protection instructions. CENTAF, USAFE, SOUTHAF and PACAF all have supplemental instructions regarding FP construction standards. Contact your theater level A7/CE planner for more information.

2.6.2. Facility Requirements. The combatant commander establishes the base camp facility requirement standard for the theater of operations by operation order (OPORD) fragmentary order. This order describes standards upon which components and subordinate units develop master plans for mission, mission support, base and community support facilities and required utilities. These standards are intended to provide the combatant commander's expectations to component commanders for base camp living and operating conditions.

2.6.3. Master Planning. Master planning provides an integrated strategy for constructing and maintaining required facilities while right-sizing budgets, equipment sets and the CE UTC(s) required to support expeditionary operations. The level of detail of the base camp master plan depends on the maturity of the location, the speed at which the operational need for a base camp develops and the expected length of stay. Master plans for expeditionary or initial standard camps may be simply a sketch of the camp, while master plans for temporary or enduring presence camps will include fully engineered construction plans based on complete surveys. Beddown and base planners should ensure they utilize and comply with guidance provided in UFC 4-010-01, *Design:* DOD *Minimum Antiterrorism Standards for Buildings,* and with UFC 3-260-01, *Design: Airfield and Heliport Planning and Design,* when planning for AEF bases.

2.6.3.1. Theater level planners will establish a process to develop, approve and implement base master plans. For joint and coalition bases, this mechanism must include representation from all affected service components or coalition allies if applicable.

2.6.3.2. Using the established process, component commanders will develop base master plans for intermediate staging and main operating airbases. Planning utilizing semi-permanent and permanent construction requires coordination and approval from your numbered air force and major command programs directorate and civil engineer.

2.6.3.3. Theater level or major command Engineer and Services experts can provide technical support and guidance for expeditionary airbase development if planning is occurring at the unit level.

2.6.4. Construction Management. Executing units will track the development of base construction in accordance with the master plan priorities and report progress in accordance with instructions published by the A7/CE directorate.

2.7. Operations and Maintenance (O&M). Effective operations and maintenance programs will maximize the life expectancy of base temporary facilities at minimum cost to the government. As the operational situation develops, more permanent structures and facilities may replace temporary facilities and structures. Airbase units will follow service regulations for the operations and maintenance of facilities and may hire civilian contractors to manage and operate the base support mission if the operational situation permits.

2.8. Expeditionary Facilities and Beddown Sets. Detailed listing for expeditionary facilities and bare base beddown assets can be found in AFPAM 10-219 Volume 5, *Bare Base Conceptual Planning Guide,* and AFH 10-222 Volume 1, *Guide to Bare Base Development,* and AFH 10-222 Volume 2, *Guide to Bare Base Assets.*

2.9. Better Deployable Facilities. Facilities and equipment used after Viet Nam have been improved to make them more deployable and livable. Major improvements were made to meet logistical and mission requirements for increased deployability for mission and base support packages, with the greatest strides occurring in the two decades between Viet Nam and Desert Shield. The post- World War II and Korea Gray Eagle kits were heavy and bulky and required excessive man-hours to position and erect. Additional equipment was added, but repackaged into sizes that are more manageable. This effort created the small 550-person Harvest Eagle packages of the early 1970s. Likewise, larger deployment kits were tested, which led to the 1970s Harvest Bare packages. Harvest Bare was refined, but testing led to the purchase of new equipment in the mid-1980s such as the Harvest Falcon system. The Harvest Falcon packages were fielded to allow deployment support for a 3,300-person wing and up to 55,000 personnel total.

2.10. Transportability Issues versus Developmental Timelines. While more user and mission friendly bare base beddown packages have evolved, the packages are still not light and small enough to allow rapid deployment by the current fleet of large frame transports. **Table 2.1.** shows the typical number of aircraft missions required to support the deployment of the standard sets (without passengers aboard). Additional missions may be required if additional site preparation is required. The erection of many current deployment packages are also man-hour intensive. This limits their application by smaller numbers of personnel that deploy to a site on an ADVON or predeployment team, who must perform site surveys. Also, the current Housekeeping sets are difficult to break up for use by small teams that require some initial short-term facilities. Given time for shipment and erection, these assets provided good support during the initial phases of a deployment to Southwest Asia. During the first few weeks of Operation DESERT SHIELD deterrent efforts, the tonnage required for initial air and ground force projection shipments depended on air transport. The air transport system was totally choked in spite of many prepositioned civil engineer assets in country or in USAFE and some personnel faced austere conditions. However, time lines for Desert Storm actually allowed about 95 percent of the transferred force-buildup tonnage to be sent by sealift. Keep in mind that the disparity in missions between the legacy (Harvest) sets and the BEAR sets is due in part to the light/lean nature of BEAR and that BEAR has optional assets that are added only as

needed (e.g. ROWPUs, MAAS, revetment kits, various dome shelters, etc). These assets are sometimes referred to as BEAR playbook options.

Table 2.1. Mission Support to Various Deployment Sets.

Type of Set	C-130 Missions	C-17 Missions	C-5 Missions
Harvest Falcon (HF) Housekeeping	45	14	7.5
HF Industrial Operations	79	16	13.2
HF Initial Flightline	162	40	27
HF Follow-on Flightline	13	3	2.2
Total HF Missions	**299**	**73**	**49.9**
Harvest Eagle Housekeeping	19	6.3	3.2
Harvest Eagle Utility	13	4.3	2.2
Total HE Missions	**32**	**10.6**	**5.4**
BEAR 150 Housekeeping	-	**1**	-
BEAR 550 Initial Housekeeping	-	**6**	-
BEAR 550F Housekeeping	-	**5**	-
BEAR Industrial Operations	-	**7**	-
BEAR Initial Flightline	-	**7**	-
BEAR Follow-on Flightline	-	**2**	-
Total BEAR Missions	-	**28**	-

2.11. Airlift Limitations versus Developmental Timeline. To meet current AEF taskings, air transport may be the only method of delivery for several months --this is recognized by all services. To meet their needs, the Army developed the Force Provider deployment packages, which evolved from a cross-version of Harvest Falcon-type assets packaged in Harvest Eagle-size packages. The Air Force has tested lighter weight, more streamlined Harvest Falcon kits that address the phasing required to reach more remote, austere bases when these locations are *airlift constrained*. The Air Force is also developing and programming replacement shelters and deployable electrical, water and sewerage systems that are lighter and more deployable. The next decade is slated to see many improvements and changes to the deployment packages to allow rapid beddown of forces tomeet the full spectrum of contingency deployments. The programs for managing and updating bare base assets now fall under the BEAR program. When possible, planners should investigate the opportunity of utilizing sealift, convoys and railways to move large assets and free up airlift.

2.12. Real World Transport/Logistics Lessons Learned : During Operation ALLIED FORCE (OAF) in Yugoslavia and Kosovo, RED HORSE units in Europe were able to mobilize prepositioned heavy equipment and beddown assets from Italy and move them via sealift and rail. On every occasion, the assets arrived ahead of equipment and resources that were prioritized as critical assets and moved via airlift. The great advantage to sea andrail is the elimination of weightconstraints that occur when moving by air. Due to severe lack of Class IV construction material in Albania, Army and Navy teams had problems erecting billeting, showers, latrines and other expeditionary combat support requirements. Within 7 days of arrival at Albania, RED HORSE had shipped in over 632 short tons of heavy equipment embedded with plywood, geo-textile materials, hand tools and other critical construction assets that were not being moved due to airlift limitations. Coordination and location of opportune sealift through Military Traffic

Management Command (MTMC) took three days. The shipment included environmental control units (ECU), bundles of AM-2 mat, expeditionary shower/shave and latrine sets. Task Force Hawk had been on the ground three weeks but it was not until the arrival of the RED HORSE assets that they received sanitary and hygiene facilities and earth-moving heavy equipment. CE and RED HORSE planners coordinated this effort outside of the prioritization of the OAF movement center and tactical airlift control center (TACC).

Figure 2.5. Sealift of Military Equipment.

2.13. Mission Considerations. Requirements for changes in deployment packages are driven by AEF mission considerations. To meet AEF rapid deployment, full-spectrum global commitments, some restrictions may have to be imposed for initial mission planning, such as:

2.13.1. Compression requirements for initial deployment timelines.

2.13.2. Restrictive limits on the number of support personnel on the ground during the initial 3 to 14 day periods.

2.13.3. Limited initial flow of equipment and support packages, as well as spreading out follow-up packages over more airlift missions.

2.13.4. Sending selected mission support UTCs in prior to ***C+0 Day*** to ready the base.

2.13.5. Employing joint concepts of support and deployment with Air National Guard, Air Force Reserve Command, Army, Marine and Navy forces.

2.13.6. All of these may be considered upfront to meet theater commander air superiority and support campaigns. Finally, the total number of transport aircraft available may be the critical factor for theater locations that are landlocked, have no accessible or nearby seaports, or lack road or other available land routes.

2.14. Influence of Base Type and Location. Typical AEF mission planning considerations will depend in a large part on the type and location of the deployment airbases. Mission timelines for initial support force and equipment UTCs will be different for each of the following situations.

2.14.1. Austere airfields for support of missions by special operational forces, A-10s, MC- and AC-130s and special operations and attack helicopters, where the initial arriving aircraft may be limited to C-17s and C-130s.

2.14.2. Large, former Soviet-bloc airfields that require some repair of hangars, maintenance facilities, utilities and pavements, but can support all types of aircraft and tent city beddowns and can be partially supported with contracts, trucked-in supplies and modular facilities.

2.14.3. Recovered, enemy commercial and military airfields that have either been denied during enemy retrograde or coalition air and ground bombardment. These were the predominant airfields occupied during the 2002-2003 OEF and OIF.

2.14.4. Typical bare bases, which can accompany initial fighters, transports (both military airlift and Civil Reserve Air Fleet) and helicopter missions, but may have limited modes of supply and transport.

2.14.5. Large airbases with a full mix of aircraft and support facilities from numerous military services or countries and supportable by several modes of transportation and supply.

Figure 2.6. Joint Forces Airbase in Bosnia.

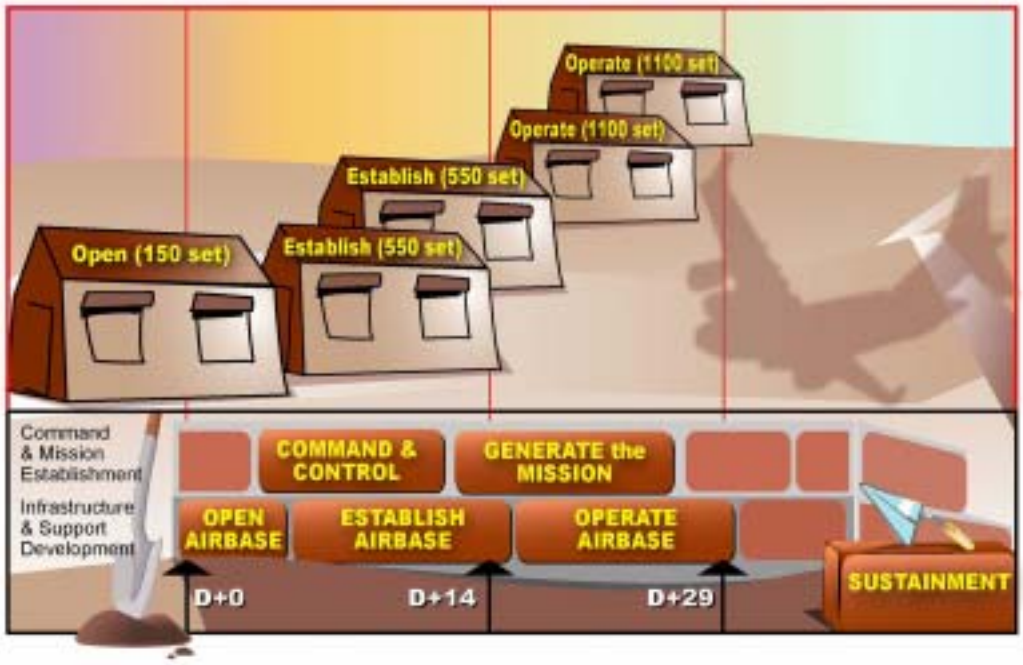
Figure 2.7. Various Construction Standards in Bosnia.

2.15. Developmental Timeline Considerations. Based on the Air Force Chief of S taff's Sight Pictures and the Agile Combat Support (ACS) Global Military Task Force (GMTF) program to implement AEF deployments, the timelines for deployment are e nvisioned through a force mo dule approach. The Air Force requires any upgrade of the bare base assets to be modular, scaleable and to meet the needs for follow-on set consistency, maintaining full flying operational support and providing theater interoperability.

2.15.1. Timeline Goals. The typical timeline goal for a 3300-person beddown is fourteen days, with initial flying operations achieved by ***C+72 Hours*** and sustainment operations phasing in after fourteen days. In order to meet a full mi ssion capability within C+14 days, o*pen the base* efforts must be planned to provide equipm ent and resources in response to mis sion and manning requirements that allow for immediate build-up and beddown upon arrival at the expeditionary airbase.

2.15.2. Force Modules and BEAR Asse ts. To meet the tim elines for force module IOC, BEAR sets are packaged to more closely align with the goal of the force modules. For instance, BEAR sets are streamlined for weight and TEMPER tents are being replaced with more readily deployable systems that are simpler to erect with fewer personnel (the Small Shelter System was widely deployed during OEF and OIF). The overall packagin g allows use without major tail oring to meet smaller mission deployments or beddowns for joint operational support of other branch of service forces. These concepts are depicted in **Figure 2.8.**, which shows both the strategic roadmap force module timeline and the conceptual modules for a BEAR package that would meet the requirements of deployment.

Figure 2.8. BEAR Sets Supporting a Force Module Beddown.



2.15.3. One major planning consideration is plugging in an *open the airbase* module (team) prior to ***C+0 Day*** to begin beddown. With an *open the airbase* beddown package, which provides short-term austere shelter and basic hygiene, a beddown team would initiate beddown with either a tailored Harvest Eagle system or BEAR system (when fully adopted). For civil engineers, the *open the airbase* team could include a combination of RED HORSE, Prime BEEF and 49 th Material Maintenance Group (49 MMG) BEAR team personnel to prepare the site, erect and install facilities, equipment and some utilities. For locations that are not in higher threat areas, planning for these types of bases should consider use of one of the contractor augmentation programs for early beddown operations. These programs are the Air Force Contract Augmentation Program (AFCAP), the Army Logistics Civil Augmentation Program (LOGCAP) and the Navy Contingency Construction Capability (CONCAP). These are covered more broadly in **Chapter 8** of this volume.

2.16. Engineering Considerations. Most of the engineering planning factors and detailed mechanical procedures for calculating requirements are covered in AFPAM 10-219, Volume 5. These civil engineer considerations are based primarily on AEF lessons learned.

2.17. Survey, Expeditionary Site Mapping (formerly GeoReach) and Other Information Based Plans. Deploying units and theater planners must have good information on what is at a location and available nearby. Developing a bare base support plan requires accurate information. Knowing what missions will be present is a major factor in determining what should be included and the amount of detail required. Experience with OAF, OEF, and Operation NOBLE ANVIL has shown that AEF missions can be much more fluid than previous Air Force deployments, usually because other services and partner nation military services are involved.

2.17.1. When there is a requirement to support new contingency missions, there may not be a specific operation plan (OPLAN) that provides specific details for the location. Rather, an operations plan in

concept form (CONPLAN) may have to be used to determine basic requirements. Whether an OPLAN or CONPLAN is used, an all-services, Timed-Phased Force and Deployment Data (TPFDD) is required that is associated with the base. The TPFDD database will contain all forces (except possible specifics on special operations forces) and the deployment timing required to deploy in support of an OPLAN or CONPLAN.

2.17.2. Problems can develop when all potential missionsare not well defined; when this occurs, civil engineer planners must make assumptions based on the best information available with respect to total mission requirements. Theater ADVON teams, through the Expeditionary Site Survey Process (ESSP), may have surveyed the site and created an Expeditionary Site Mapping comprehensive installation picture (CIP) with GPS located survey inputs. Some of the more specific requirements for potential mission support of an airfield may be available from site surveys conducted by Air Mobility Operations Groups (AMOG), Tanker Airlift Control Elements (TALCE), Contingency Response Groups (CRG), Special Tactics Teams (STTs) and previously completed Base Support Plans (BSPs) or theater Civil Engineer Support Plans (CESPs). It is imperative that A7 or theater level CE planners have the appropriate security clearance level for joint and AF war plan efforts.

2.17.3. With the exception of support to special operations forces, you should be able to obtain and review (before going on the survey) the TPFDD to determine the basic deployment forces that will drive the population-based requirements. Examples of basic information are the number of aircraft by type, the total base population and the phased basepopulation over time, transient forces and expected duration of the operation.

2.17.4. Good sources of information are operations plans, base maps, aerial photographs, construction drawings, past site surveys, data contained in intelligence office documents, information from a previously deployed unit and information from the theater, Aerospace Expeditionary Force Center (AEFC), or MAJCOM staffs. Until Expeditionary Site Mapping has reached full maturity, civil engineers need to obtain both unclassified and classified information as best they can for each initial deployment. When replacing a deployed unit, incoming civil engineers should use the SECRET Internet Protocol Router Network (SIPRNET) and secure telecommunications to determine what may really be required to replace the current force for sustainment operations.

2.18. Airfield Surveys and Operational Data Collection. The success of an expeditionary airfield is directly related to the condition of the runway. This is reflected in the effort the Combined Force Air Component Commander (CFACC), Combined Force Land Component Command (CFLCC) and various organizations put into the deployment of numerous pavement evaluation teams. In light of limited and constricted transportation into many of these areas, it is critical that planners identify the correct requirement and task the appropriate team. The following teams and their capabilities are listed to assist in this selection.

2.18.1. AFCESA Pavement Evaluation Team. The AFCESA Pavement Evaluation Team is governed by AFI 32-1041, *Airfield Pavement Evaluations.* The AFCESA Pavement Evaluation program focuses on airfield support to MAJCOM/NAF/CFACC and bases by providing the following services for both peacetime and contingency operations:

2.18.1.1. Develop pavement guidance and criteria.

2.18.1.2. Perform airfield structural pavement evaluations.

2.18.1.3. Perform airfield frictional characteristics (skid) evaluations.

2.18.1.4. Provide technical support to the MAJCOM and bases.

2.18.2. Tanker Airlift Control Elements (TALCE). Air Mobility Command (AMC) trained, equipped and tasked airfield evaluation teams perform site surveys to determine airfield suitability for aircraft operations. TALCE units are tasked through HQ AMC-TACC/ XOPM, Scott AFB, DSN 779-3071. Airfield surveys are published on AMC IMT 174, Airfield Survey, and are used to update Airfield Suitability and Restrictions Report (ASRR). ASRRs include airfield geometry assessment, navigational aids (NAVAID), hazards to flight determinations, aircraft parking area aprons, pavement flow capabilities, and maximum (aircraft) on ground (MOG) capacity.

2.18.3. Global Assessment Teams (GAT) were created by AMC during OEF to serve as the advance planning team for AMOG/TALCE units. GATs establish austere initial airfield operations. GATs are tasked through HQ AMC-TACC/XOPM, Scott AFB, DSN 779-3071.

2.18.4. Contingency Response Groups (CRG) are a first-in, multi-discipline force that secure and establish airfield operations. CRG are comprised of Security Forces, Initial Airlift Support, Civil Engineering and Communications. CRG are positioned and equipped for short-term operations and deployment. CRGs are tasked through the Unified Combatant Command and equipped to complete airfield surveys as detailed on AMC Form 174.

2.18.5. RED HORSE units are mobile, heavy construction squadrons that are equipped to provide airfield assessment and repairs.

2.18.6. Special Tactics Teams (STT) are Special Operations teams used to survey and certify semi-prepared airfields, landing zones and assault strips via AF Forms 3822 and ASRR. Surveys include geometrics, NAVAIDS, hazards to flight, semi-prepared airfield load bearing capability. STT are tasked by the 720th Special Tactics Group at Hurlburt Field, Florida, DSN 579-4250.

2.18.7. Expeditionary Site Survey Process (ESSP) standardizes the process of producing airfield survey data and providing decision makers with reliable and substantive mission planning information. ESSP deploys survey teams of high trained individuals to perform pavement evaluation, full spectrum threat assessment, airfield suitability reports and beddown surveys with LOGCAT/Expeditionary Site Mapping integration. The directorate of logistics readiness (HQ US AF/ILG) is responsible for Air Force ESSP policy and guidance, while the MAJCOM logistics plans function provides oversight for all expeditionary site surveys in their AOR. Additional information on ESSP roles and responsibilities can be found in AFI 10-404, *Base Support and Expeditionary Site Planning*.

2.18.8. The National Geospatial-Intelligence Agency (NGA; formerly the National Imagery and Mapping Agency or NIMA) has completed surveys of all airfields worldwide. During Operations NOBLE ANVIL, OAF, OEF and OIF planners utilized these surveys for beddown planning purposes. This proved risky since less than 1% of structural data is taken from true technical information. The majority of facility capacity and capability is estimated from imagery taken of similar airfields or is taken from reports of airfield managers. This data may be skewed by host nations for political or economic reasons. NGA information provides a good initial baseline and satellite imagery for initial planning.

2.19. Priority Requirements During Planning. Based on lessons learned, it is very important to identify those items, which must be in the initial support packages, but are not normally included. If a standard deployment package flows as established in the TPFDD and a site survey shows that there is a critical need to have another package component arrive earlier, then this is a major concern that should be ele-

vated. Heavyweight, large-cube items, such as construction equipment, fire trucks and dump trucks, have been left on a ramp at an intermediate aerial port or back at a theater's prepositioned-storage site awaiting airlift support when transportation flows are airlift constrained. Based on the mission, surveys must determine if initial beddown activities can be accomplishedwithout a large amount of site preparation. If initial beddown efforts require these assets, then alternate procedures, scheduling or support may be required to allow this to happen. Actions must be coordinated between theater planners, the AEF wing and United States Transportation Command (USTRANSCOM). Here is an example.

2.19.1. A former Soviet base now controlled by a partner nation will be used for a force beddown. If you just looked at aerial photos and used old Soviet-era intelligence reports, the base would appear to have an adequate runway, taxiway and ramp, as well as a water source and some damaged flightline buildings that can be easily repaired. However, a site survey might show that the base is on a rock-hard, rocky surface that has toxic environmental spills affecting some areas of the ground surface and water sources. While expedient repairs to existing facilities are practical, they would require structural work and for safety reasons, these efforts would have to be completed prior to occupancy.

2.19.2. If the deployment buildup were to be phased in over several months, the base could be developed without deploying additional up-front resources. However, if a 3300-person bare base were required by ***C+23 Day***, then the TPFDD would have to be adjusted. Deployment packages should be tailored to reflect Prime BEEF UTCs as one of the initial teams arriving with AFCAP (or other contractors) and RED HORSE personnel to: clean up or contain the spill, conduct more arduous surface preparations, repair the flightline buildings and possibly drill a well, provide additional reverse osmosis water purification units (ROWPU) or supply an alternative means for obtaining drinking water.

2.20. Coalition or Host Nation Support Capabilities and Limitations. A host nation (HN) is a nation where US military personnel are deployed by government invitation or international agreement. A partner nation is a nation where US military personnel deploy by government invitation or international agreement and their military forces may be participants under a military agreement or treaty. A host nation's resources, assets and facilities may exist at the location and may be available for use or support. Theater and State Department sources, such as military liaison offices or partner nation military personnel on station, can sometimes provide valuable information on host nation capabilities and information on: contracts, sources of supply, availability of equipment and materials (as well as an idea of the cost to do business) and points of contact with the local government. Another important piece of information pertains to the willingness of a host nation to provide facility and utility support and joint use of assets.

2.20.1. The availability of HN support may enable CE units to reduce support and transportation requirements by securing formal and informal agreements with HN authorities. Contact your wing or theater judge advocate for guidance prior to entering into any agreements or interpretation of existing agreements. The Joint Forces Commander (JFC) usually establishes a single office to serve as the executive agency to manage and coordinate host nation support during wartime. Airbase and Air Component Command representatives use this office, according to JFC regulations and guidelines, when entering into any formal agreement with HN authorities.

2.20.2. Units that deployed in support of OEF found that conducting smaller humanitarian and civic assistance (HCA) support projects for local communities often improved the overall ability to obtain local resources and labor for on-base work. Even when there are few local resources, it is good to conduct humanitarian efforts to improve the political climate in terms of host nation support for the location and effort. It is important that outgoing civil engineers orient, familiarize and even introduce their

replacement to key local and regional government points of contact. Even with the willingness of local officials to support deployment efforts, sometimes there are economic or physical constraints that affect use of the deployment site.

2.20.3. When leasing of land is a problem, deployed AEF units have found that Army Contingency Real Estate Support Teams (CRESTs) can often provide support in-theater. CRESTs can obtain longer-term leases, provide needed continuity when dealing with local officials and landowners and have more contracting authority than Air Force contracting. Your theater civil engineer staff can facilitate CREST assistance.

2.21. Mine/UXO Presence. Many bare bases have been established through long-term government agreements with traditional treaty or agreement allies/partners; the bases were readied with peacetime construction programs. AEF deployments within a theater's area of responsibility (AOR) must often rely on use of airfields or airports that have been made available on a short-term basis and often may have been exposed to ethnic, sectarian, or regional violence. When this is the case, opening the airfield and the surrounding airfield environment for base beddown usually becomes a much greater problem and dangerous situation due to mine fields and UXOs.

2.21.1. Air Force and other service EOD teams usually have to enter the location first and start clearing the runway and the areas adjacent to it, the taxiways and aprons. Initial forces can then land, offload equipment and stay in any adjacent area that has been cleared of mines and UXOs. However, actual layout of the base, construction of outlying and nearby defensive fighting positions, positioning and erection of shelters and running of utilities becomes a slow process as EOD teams clear each area one portion after another. This usually requires mine detection and safing or demolition and identification, as well as safing and disposal or demolition of UXOs.

2.21.2. Mines or UXOs that have been rendered safe by in-place demolition will also require subsequent leveling and grading of the craters. For areas with many mines, additional equipment may be required from Army, British, or combat engineers from other capable countries with mine dozers/plows or flails. Again, additional site preparations may be required to recover the areas where plows had to be used.

2.21.3. With these basic precautions, beddown can proceed within cleared areas for erection of facilities and surface layout of utilities. However, burying utilities can be a very slow process. Mines and UXOs located below the surface (especially in areas subject to flooding with drifting soil/sand), could explode when hit or uncovered by trenching for utilities. EOD teams may have to scan or sweep for additional UXOs and mines directly along the pathways for utility trenching.

2.22. Considerations for Joint Operations Beddowns. Do not assume that another service is preparing the support plan or is planning to take on the base operating support responsibility. Do not assume that the Air Force or another service will be in charge when you arrive. Air Force and Army lessons learned from initial AEF deployments to remote, joint service bases showed that the initial command structures at these locations were often too fluid for anyone to be in charge during the initial beddown operations, and the overall command and control of the location could change several times from initial beddown through sustainment. Changes in base missions cause extraordinary increases in personnel and the need for support services and facilities. Unit deployment planners must work with theater civil engineers and planners to identify locations that will be used for major staging operations. During OEF, some bases expanded from an expected 300 persons to over 7,000 persons.

2.23. Support Plans. When an airfield had no previous survey for beddown requirements, the first units in need to know what other units are coming so they can determine the general size and layout of the base. For sizing purposes only, base planners should consider as a contingency scenario that unit departures may overlap with unit arrivals and that both may have to operate on the base for some time. They should also take into account that expedient sanitation facilities may have to be used initially, which can create the need for additional land area. Finally, joint service may also mean that partner nation military forces are employed at the location besides just US Army , Navy or Marine units. Beddown planners must be given the full picture on who will be at the location and when theywill serve. Ideally an expeditionary site mapping-based theater CESP or AEF BSP would include a base layout, which would address all missions and be coordinated by other stakeholder service branches. This is rare. More frequently, the initial AEF civil engineer force will arrive at a location and have to report to the interim, ranking AF officer (such as the TALCE commander). This is because the initial forces from other services at joint service bases are often combat forces, which do not have base construction responsibility. Careful consideration during planning must be given to service munition operation/storage requirements because of their associated explosive safety quantity distance (ESQD) arcs which limit available beddown areas.

2.23.1. When TPFDD based information is used for initial beddown planning and layout, develop support plans and layouts to take into account all the beddown resources that will be used that are compatible. Until Air Force Harvest Falcon systems and Army Force Provider systems become interoperable for utilities (either through changes in the utility systems or conversion kits), like systems may have to be grouped with specific personnel (i.e., Army with Force Provider). Unless there is adequate room to separate services for independence of efforts, plan on siting in common groupings as much as possible (to allow connection of compatible utility systems), such as billeting and support service areas, maintenance and industrial areas, flightline areas, medical facilities and separated munitions areas. If other services' engineers or planners are present, use their knowledge and skills when developing the layout, as they should be more familiar with their service's requirements. Army engineers can be valuable when planning for sustainment, as many have an automated beddown program (i.e. Theater Construction Management System) that provides basic designs and bills of material for various types of construction, facilities and standards.

2.23.2. While Air Force units have taken some pressure for wanting to provide quality of life living standards and facilities *too early* in base development, other services have faced the problem of not identifying *early enough* clearly defined living standards for base camps and staging bases. Theater commanders should have identified acceptable living standards to plan for during initial deployments.

2.23.3. Many joint service bases are supposed to be*purple suit* operations with shared responsibilities for base operations support. In other cases, one service may open the base and maintain responsibility, or take over the responsibility for all support. The TPFDD addresses the requirement for support of an airbase and/or base camp. In some cases, it is essential that other services provide or augment initial key bare base skills, such as fireprotection, bio-environmental, utilities (water and waste), power generation and environmental (pest management). When the TPFDD requires the Air Force to be supported by these personnel early on in the deployment, AEF civil engineers and planners should contact the other services' units and coordinate arrival schedules to ensure that the other services' engineers can be there as scheduled in the TPFDD. Be aware that often these engineering personnel would not be mobilized early enough for initial support, since they typically arrive when their service accepts responsibility for base operating support. There absence could delay beddown of facilities and utilities or cause crucial delays in overall beddown.

Figure 2.9. MREs vs. Mobile Kitchen Trailer.

2.24. Expeditionary Combat Support (formerly Base Operating Support). ECS includes the provision of supplies, vehicle maintenance, civil engineering support, services support (including food service, billeting, laundry, mortuary affairs, recreation centers and fitness centers), communications, security and general administrative support. During AEF deployments for OEF, it became evident that there was a basic difference in the ECS concept of operation between the Air Force and the Army.

2.24.1. AEFs deploy as a wing (or a portion of a wing with groups and squadrons from other bases) and form an AEW. Air Force ECS is integral with the wing structure.

2.24.2. The Army has combat engineers and support personnel to support mobile combat operations, but they do not perform the ECS function. The Army has various support battalions that provide *stationary* base operating support, but most of these are reserves. For combined base camps/airfields initially supported by the Air Force and partner nation engineers, Army units often could not take over ECS until all preparations were in place.

2.24.3. Check deployment orders to ensure that theater planners have addressed base operating support and transfer of responsibility. Start early on in the deployment to track and account for resources to ensure that equipment/assets can be reassigned during transfer of responsibility. In some cases, an Air Expeditionary Group may have to remain at the location to support Air Force personnel and monitor/control equipment/asset accounting.

2.25. Command and Control Relationships. When the deployed location is designated as a numbered AEW, whether or not the expeditionary civil engineer squadron is primarily from one base or is composed of numerous units or individuals, it is important that all Air Force civil engineers are formed together (and billet together) as a unit. This type relationship may be harder to enforce when civil engineer forces include Air Force, Army/Navy/Marine (i.e., other service branches), or international personnel assigned for support of the airbase. The best policy is to integrate similar forces into one designated work-tasking unit, whether the unit is a blue, purple, or plaid suite operation, not withstanding any possible need to separately billet by service/nation.

Chapter 3

PLANNING FOR BASE OPERATING AND SUPPORT FACILITIES

3.1. Overview. The Army, Navy, Air Force and Marines each have differing standards for base Operating Support. This chapter establishes planning guidelines, authorizations and standards for contingency bases at various stages of development.

Figure 3.1. Bare Base Sighted Alongside Host Nation Facilities.

3.2. Purpose. To provide definitions and standards for facilities, utilities and personnel support within forward operating locations, forward operating bases, main operations and intermediate staging area airbases.

3.3. Facility Standards for Base Camps. During the evolution of a contingency airbase, infrastructure and facilities will progress from initial to semi-permanent construction standards depending on mission requirements and operational duration. Definition and description of authorized end-state facility construction standards are listed in **Table 3.2.**, pages 3-4 through 3-6. The Component Commander of CFACC has the authority to establish expeditionary airbases at any construction standard based on operational requirements and resource availability. AF guidance on authorized facility requirements and standards is listed later in this chapter (Expeditionary Airbase Development Matrix) and in AFH 32-1084, *Facility Requirements*. This guidance applies to all base camps, regardless of the stage of development. The matrix clarifies the desired construction quality for each facility at various stages of development. It is understood that meeting these standards will be a progressive effort. Theater and MAJCOM CE staffs will strive to meet the standards contained in this chapter as quickly as the operational, resource and coordination (programming, approval and funding for semi-permanent and permanent standards) situation allows.

3.4. Force Protection and Safety. Antiterrorism force protection and physical security in the expeditionary environment present unique challenges to planners, engineers and security forces. The threat type,

severity and desired level of protection are the primary considerations when selecting AT/FP and physical security measures. These considerations will be used to identify vulnerabilities, reduction measures and the siting of facilities. In the expeditionary environment, important security planning factors include: availability of existing facilities, types of structures, existing natural or man-made features, types and quantity of indigenous construction materials, available real estate and other base infrastructure. Pre-existing buildings will be renovated to meet DOD, AF and CFACC force protection and security standards. These standards will provide guidance for developing strategies to mitigate the effects of specific aggressor tactics, defined levels of protection and effects on building costs of applying those measures. Specific force protection measures and planning considerations are detailed in **Chapter 7** of this volume.

3.4.1. UFC 4-010-01, *Design:* DOD *Minimum Antiterrorism Standards for Buildings,* outlines the threat level and construction requirements for facilities in both expeditionary and permanent bases. **Table 3.1.** is extracted from UFC 4-010-01 to give the CE planner an idea of the required level of AT construction standards and the implications of the various standards for expeditionary construction. These factors will allow the CE planner to adequately brief the combined forces commander or theater planner on ramifications of programming and funding for construction at various levels. Ultimately, the component commander, with the guidance of his staff civil engineer, will be responsible for defining construction standards for their various bases as outlined in **Chapter 1** of this publication.

3.4.2. Levels of protection are described in **Table 3.1.**, **Table 3.2.** and **Table 3.3.**. These standards provide a low level of protection for billeting and primary gathering buildings because of the higher concentration of personnel and attractive nature of the target. The effects of utilization of various standards of protection can be mitigated by additional active and passive measures such as increased standoff distances, perimeter fencing, alarming etc. The impact of increased AT standards results in significant improvement to the facility and personnel survivability but comes at the expense of increased funding, beddown execution timelines and resources. These must be balanced to meet the CC's mission requirements.

3.5. Authorized and Required Facilities. As part of the deployment planning and base beddown process outlined in AFPAM 10-219 Volume 5, it is imperative to ensure that limited resources are applied to prioritized mission requirements. The bottom line during planning is that there will never be enough space and assets to make everyone happy and give them what they think they deserve. In light of this, it is up to the civil engineer planners and mission support group planners to oversee the planning board and minimize conflict. **Table 3.2.** provides some basic guidelines on facility authorization at different contingency locations to better facilitate some of the facility utilization planning.

Table 3.1. Levels of Protection – Expeditionary and Temporary Structures.

Level of Protection	Potential Structural Damage	Potential Injury
Below AT Standards	Severely damaged. Frame collapse/massive destruction. Little left standing	Majority of personnel suffer fatalities.
Very Low AT Standards	Heavily damaged. Major portions of the structure will collapse (over 50%). A significant percentage of secondary structural members will collapse (over 50%).	Majority of personnel suffer serious injury. There are likely to be a limited number of fatalities (10-25%)
Low AT Standards	Damaged – unrepairable. Some section of the structure may collapse or lose structural capacity (10-20% of structure)	Majority of personnel suffer significant injuries. There may be few fatalities (<10%).
Medium AT Standards	Damaged – repairable. Minor to major deformations of both structural members and non-structural elements. Some secondary debris will be likely but the structure remains intact with collapse unlikely.	Some minor injuries, but no fatalities are likely.
High AT Standards	Superficially damaged. No permanent deformation to primary and secondary structural members or non-structural elements.	Only superficial injuries are likely.

Table 3.2. Expeditionary Airbase Construction Standards in Theater. (MOB Guidelines – Refer to Atths 4, 5 & 6 for detailed info).

EXPEDITIONARY STANDARD. Characterized by extremely austere facilities requiring minimal engineer effort to initiate operations. Intended for limited operational duration (< 90 days). Intended for operational personnel and resources only. Support and supply operations to be maintained by host unit at support MOB or ISB.
INITIAL STANDARD. Characterized by austere facilities requiring minimal engineer effort. Intended for immediate operational use by units upon arrival for a limited operational duration (up to 6 months). May require replacement by more substantial or durable facilities during the course of operations and mission growth.
TEMPORARY STANDARD. Characterized by austere facilities requiring additional engineer effort above that required for initial standard facilities. Intended to increase efficiency of operations for use up to 24 months. Provides for sustained operations. Replaces initial standard where mission requirements dictate. Temporary standards may be used initially if directed by the combatant commander.
ENDURING PRESENCE STANDARD. Characterized by well-developed facilities & infrastructure requiring additional engineer effort above that required for temporary standard facilities. Intended to increase operational efficiency for use over 24 months. Provides for sustained operations through more durable construction materials, better energy conservation systems, & master planning efforts. Requires programming, funding, design, & construction management through theater C7 or MAJCOM A7.
WARM BASE STANDARD. Characterized by well developed infrastructure requiring additional engineer effort for opening the airbase. Intended to increase speed of beddown by requiring erection of prepositioned tents, resources and assets. Maintained by caretaker organization (military unit or civilian contract). Warm bases are identified and established by the theater C7 and/or MAJCOM/NAF A7.

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Site Work	As required to support beddown (dependent upon site, local and climate).	Minimal clearing and grading as required for mission requirements. Heavy equipment very limited at expeditionary standard bases.	Clearing and grading for facilities sites including drainage, revetments of petroleum, oil and lubricants and ammo storage and aircraft parking; aggregate for heavily used hardstands; and soil stabilization.	Engineered site preparation, including paved surfaces for vehicle traffic areas and aircraft parking, building foundations and concrete floor slabs.	Engineered site preparation, including paved surfaces for vehicle traffic areas and aircraft parking, building foundations and concrete floor slabs with masonry or pre-engineered building systems.	Clearing and grading for facility sites including drainage, revetments for petroleum, oil and lubricants, ammo storage, and aircraft parking; aggregate for heavily used hardstands; and soil stabilization
Billeting	E1-E5 = 80 NSF E6/E7 = 130 NSF O1/O2 =130 NSF E8 = 160 NSF O3/O4 = 160 NSF E9 = 256 NSF O5/O6 =256 NSF O7+ = 512 NSF DV/VIP = 2,944 NSF per base	Tents/Host Nation facilities when available.	Tents (may have wood frames and flooring).	Wood frame structures, re-locatable structures and modular building systems.	Wood frame structures, modular and/or masonry/ prefabricated structures.	Concrete pads for tents.

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Dining Facility	860 NSF per 1,000 assigned personnel	Tents/Host Nation facilities when available.	Tents (may have wood frames and flooring).	Wood frame structures, re-locatable structures and modular building systems.	Wood frame structures, modular and/or masonry/ prefabricated structures.	Concrete pads for tents.
Electricity	Refer to AFPAM 10-219 Volume 5, Attachment 7 for planning guidance	Tactical generators: high and low voltage distribution.	Tactical generators: high and low voltage distribution	Non-tactical or commercial power and high or low voltage distribution	Local power primary and secondary service with buried utilizes and generator back-up	Local power with generator back-up
Shower Facilities	1 Shower head per 20 Personnel (Minimum)	Tents/Host Nation facilities when available HF/FP; shower/shave sets when available.	HF/FP shower shave units and HN facilities when available with above ground utilities and wastewater storage tanks.	HF assets, HN facilities and modular/package units with underground utilities.	Modular/package units upgrading to permanent facilities with underground utilities.	Concrete pads for tents with in-place underground utility distribution and collection systems
Potable Water	15 gallons per person per day.	Bottled water and/or local supply.	ROWPU purification of water points, wells or other potable water production and pressurized water distribution systems.	Limited distribution to hospitals, dining halls and other large users.	Water points, wells, HN primary distribution and/or other potable water production & pressurized water distribution systems.	Water points, wells, host nation primary distribution and/or other potable water production and pressurized water distribution systems.
Non-Potable Water	Generation of 15.5 gallons per person per day.	Local source (wells, host nation utility lines).	Local source (wells, host nation utility lines).	Local source (wells, HN utility lines).	Local source (wells, host nation utility lines).	Local source (wells, host nation utility lines).
Cold storage	Dependent upon on base food preparation, medical, and related requirements. Refer requirement to theater level planning section.	Portable refrigeration with freezer units for medical, food and maintenance storage.	Portable refrigeration with freezer units for medical, food and maintenance storage.	Refrigeration installed in temporary structures.	Refrigeration installed in permanent, masonry or PEB buildings.	Not Applicable
Latrines	1 Toilet per 15 personnel (Minimum).	Burnout/Slit latrines and Host Nation facilities	Chemical units, HF/FP Latrine Units and associate support equipment.	HF/FP Latrine units upgrading to modular/ package units with underground utilities and collection.	Wood frame structures, modular and/or masonry/ prefabricated structures with underground utilities.	Concrete pads for tents with underground utilities.

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Sewage Disposal and Treatment		Organic equipment, evaporative ponds, leech fields, pit or burnout latrines.	Organic equipment, evaporative ponds, pit or burnout latrines, lagoons for hospitals and sewage lift stations.	Waterborne to austere treatment facility – priorities are hospitals, dining halls, bathhouses, decontamination sites and other high volume users.	Wastewater collection and treatment system via host nation infrastructure or purchased package units.	Wastewater collection and treatment system via host nation infrastructure or purchased package units.
Airfield pavement *	Refer to AFJMAN 32-8013 Volume 2.	Tactical surfacing, including matting, aggregate, soil stabilization and concrete pads.	Tactical surfacing, including matting, aggregate, soil stabilization and concrete pads.	Conventional pavements.	Conventional pavements.	Conventional pavements.
C130/C17 Runway	Refer to AFJMAN 32-8013 Volume II	Stabilized Earth	Stabilized Earth	Conventional pavements	Conventional pavements	Conventional pavements
C130/C17 Taxiway	Refer to AFJMAN 32-8013 Volume 2	Stabilized Earth	Stabilized Earth	Conventional pavements	Conventional pavements	Conventional pavements
C130/C17 Parking Apron	Refer to AFJMAN 32-8013 Volume 2	Stabilized Earth	Stabilized Earth	Conventional pavements	AM-2 Matting	Conventional pavements
C5/Tanker/747 Runway	Refer to AFJMAN 32-8013 Volume 2	Conventional Pavements	Conventional Pavements	Conventional pavements	Conventional pavements	Conventional pavements
C5/Tanker/747 Taxiway	Refer to AFJMAN 32-8013 Volume 2	Conventional Pavements	Conventional Pavements	Conventional pavements	Conventional pavements	Conventional pavements
C5/Tanker/747 Parking Apron	Refer to AFJMAN 32-8013 Volume 2	Conventional Pavements	Conventional Pavements	Conventional pavements	Conventional Pavements	Conventional pavements
Aviation Maintenance		HF-FP Tents	HF-FP Clamshells	Prefabricated/ Pre-engineered Hangar facilities	Clamshells to pre-engineered steel and concrete hangar facilities.	Concrete pads for tentage and/or clamshells
Helipad	1 lighted pad per base (minimum); refer to AFJMAN 32-8013 Vol 2.	Stabilized earth	Concrete	Concrete	Concrete	Concrete
Fuel Storage	Refer to theater Fuels planner for space requirements.	Bladders	Bladders	Bladders and steel tanks	Metal tanks and permanent installed steel distribution lines and dispensing points	Concrete pads and containment berms for bladders

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Munitions Storage Area (MSA)	Refer to theater Munitions planner for storage space requirements.	Stabilized earth with blast protection berms with perimeter concertina fence and guards	Gravel pads with blast protection berms with perimeter concertina fence and guards.	Gravel pads with blast protection berms and perimeter concertina fence. Guard house, with secure ECP equipped with counter mobility barriers.	Concrete pads with blast protection berms and perimeter chain-link fence. Guard house, with secure ECP equipped with counter mobility barriers.	Concrete pads with blast protection berms and perimeter chain-link fence. Guard house, with secure ECP equipped with counter mobility barriers
Squadron Operations Facilities	Each flying squadron is authorized 10,000 *	Tents (Tier I), HF/FP Expandable Shelter Assets and GP Shelters	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, re-locatable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents
Office Space (Open Plan layout with 10% added for common areas)	Per person E1-E6 = 60 NSF E7 = 90 NSF E8/O1-O3 = 110 NSF E9/O3 CC = 100 NSF O4-O5 = 150 NSF	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, re-locatable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents
Office Space (Private Offices when mission, space and assets allow,)	E9/O3 CC = 100 NSF O4-O5 = 150 NSF O5-O6 CC = 200 NSF E9 SEA = 200 NSF 07+ = 300 NSF	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents
Squadron HQ Facilities	1,536 NSF per Squadron	Tents (Tier II/III, may have wood frames and flooring), HF GP Shelters or Expandable Units	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents
AEW Wing HQ Facilities	Maximum allowance of 5,376 NSF per base	Tents (Tier II/III, may have wood frames and flooring), HF GP Shelters or Expandable Units	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Office Space for Headquarters, JTF, NAF or CFACC equivalent	Use above listed office allowances plus an additional 40% space authorization for storage, conference rooms, copiers etc.	Tents (Tier II/III, may have wood frames and flooring), HF GP Shelters or Expandable Units	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents
Storage Facilities	As identified by user requirements	Unit Tents	Tents (Tier II/III, may have wood frames and flooring)	MILVAN/CONEX	Masonry/Pre-engineered Steel Warehouses (Usually housing prepositioned assets)	Pre-Engineered Warehouses
Vehicle Maintenance	1,480 sq ft per Group with 640 SF associated admin office space	HF-FP Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Clamshell/Modular facility with repair bays	Clamshell to permanent modular, masonry or pre-engineered building	Concrete pads for tents and repair yards
Vehicle Hard Stands	As required to accommodate supported equipment	Stabilized Earth	Gravel	Concrete	Concrete	Concrete
Wash Racks	45’ x 100’ flat rack with oil and water separator	Not Authorized	Gravel	Gravel	Elevated wash rack on concrete pad with oil and water separator with re-claimer	Gravel/Concrete pads
Medical Facilities	Refer to theater Medical Planner for specific Guidance	Units Tents (Tier I)	HF-FP Facilities	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents
MWR Warehouse	1 NSF per person	Not Authorized	Not Authorized	Tents	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pad for tents
Supply Warehouse	Dependent upon equipment density and mission requirements	HF-FP Warehousing assets	HF-FP Facilities	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pads for Tents
Individual Equipment Issue (IEU)	1 NSF per assigned base personnel	HF-FP Facilities	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/prefabricated structures	Concrete Pads for Tents	Concrete Pads for Tents

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Fitness Center	3 NSF per person	None	Tents (Tier II/III, may have wood frames and flooring)	HF-FP Tents to Wood frame and/or modular structures	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pad for tents
Field House	Large enough to accommodate full sized basketball court (50'x94')	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	HF-FP Tents to Wood frame and/or modular structures	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pad for tents
Recreation Pavilion	1 Court per 1,000 assigned	Not Authorized	Not Authorized	HF-FP Tents to Wood frame and/or modular structures	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete Pad for tents
Running Track	1 outdoor trail (2 miles in length) is authorized when local antiterrorism and force protection situation allows	Not Authorized	Not Authorized	Dirt track upgraded to paved	Paved asphalt track	Graded Dirt Track
Athletic Fields	Each MOB is authorized 2 sand volleyball courts, 2 horseshoe pits, paved outdoor basketball court (1/2 court), MOBs with over 2,000 assigned personnel are authorized a 2nd set	Not Authorized	Not Authorized	Open fields graded to support requirement	Open Fields with fencing, area lighting and support structures	Open fields with lights
Community Activity Center	2,400 NSF per 1,000 personnel assigned	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	HF-FP tents to wood frame and/or modular structures	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pad for tents
Theater	Authorized where base population exceeds 1,000 personnel (capacity not to exceed 500 personnel)	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame or metal prefabricated structure	Masonry, Metal prefabricated buildings	Concrete pad for tents
Chapel	1,624 NSF per 1,000 assigned personnel	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Perimeter/Security Fence	As required based on base Force Protection plan and threat assessment	Concertina Wire	Triple Standard concertina wire	Triple Standard concertina with counter mobility berms	Chain link fence with barb wire outriggers and vehicle barriers	Triple Standard concertina with counter mobility berms
Security Forces Working Dogs Kennels	Interior SF = 145 NSF per dog (to include kitchen, tack room). Interior dog run = 36 NSF per dog Exterior Dog Run = 48 NSF per dog	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	HF-FP tents to wood frame and/or modular structures	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pad for tents
Perimeter/Security Lighting	As required based on base Force Protection plan and threat assessment	Gen sets, light carts and Remote area lighting systems (RALS)	Gen sets, light carts and Remote area lighting systems (RALS)	Pole mounted hardwired lights	Pole mounted hardwired security lights with centralized control systems	Pole mounted hardwired lights
Guard Towers	As required based on base Force Protection plan and threat assessment	Not Authorized	Not Authorized	Standard SF design	Standard SF design	Standard SF design
Entry Control Point	As required based on base Force Protection plan and threat assessment	Guards and vehicles or equipment used as counter vehicle barriers	Berms, serpentine with concrete barriers and vehicle barriers with search pit	HESCO Barriers, enclosed or covered vehicle search area and search pit, concrete barriers and vehicle barriers with minimal guard building with portable latrine facilities	HESCO Barriers, enclosed or covered vehicle search area and search pit, concrete and vehicle barriers with minimal guard building with latrine and electronic controls (perimeter cameras, motion alarms, etc.) guard building	Chain link entry fence/gate with vehicle barriers and covered entry control vehicle search pit
Detainee Retention Facility		Tents with concertina wire perimeter fencing	Tents with concertina wire perimeter fence and over watch towers	Wood frame structures with chain link perimeter fencing with triple strand barb wire outriggers and over watch guard towers	Wood frame structures with chain link perimeter fencing with triple strand barb wire outriggers and over watch guard towers	Tents with concertina wire perimeter fence and over watch towers
Education Center/ Library	1,710 NSF per 1,000 assigned personnel	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	HF-FP tents to wood frame and/or modular structures	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pad for tents

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Post Office	1,710 NSF per base	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
Field Exchange	See **Table 3.3.**	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
Field Exchange/ Warehouse	See **Table 3.3.**	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
Barber Shop	See T**Table 3.3.**	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
Food Concession Stands	See **Table 3.3.**	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
Food Concession Dining Area	See **Table 3.3.**	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
Alteration, Pressing, Laundry	See **Table 3.3.**	Not Authorized	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
Fire	Refer to DODI 60556.6 and AR 420-90	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents
EOD	300 NSF per person with attached covered vehicle storage (enclosed in extreme environments) Refer to AFMAN 91-210	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Wood frame structures, portable structures and modular building systems	Wood frame structures, modular and/or masonry/ prefabricated structures	Concrete pads for Tents

FACILITY	AUTHORIZA-TION	EXPEDITIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
DRMO	1 NSF per assigned person	Tents (Tier I)	Tents (Tier II/III, may have wood frames and flooring)	Prefabricated Metal/ Modular building with Gravel storage yard	Prefabricated Metal/ Modular building with Gravel storage yard	Concrete pads for Tents
DRMO Storage Yard	2 NSF per 1,000 assigned personnel	Gravel Lot	Gravel Lot	Gravel Lot	Asphalt Lot	Asphalt Lot
Roads/Streets (Primary)	As required by base layout	Stabilized Earth	Gravel	Asphalt with Concrete turnouts	Asphalt with concrete turnouts	Asphalt with concrete turnouts
Roads/Streets (Secondary)	As required by base layout	Stabilized Earth	Stabilized Earth	Gravel	Asphalt with concrete turnouts	Asphalt with concrete turnouts
Personnel Flight Operations (MPF)	1,024 SF per base	Tier I Tents	Tents (Tier II/III, may have wood frames and flooring)	Prefabricated Metal/ Modular building with Gravel storage yard	Prefabricated Metal/ Modular building with Gravel storage yard	Concrete pads for tents
Morgue	512 SF per AEW with refrigerated storage space	Tier I Tents	Tents (Tier II/III, may have wood frames and flooring)	Prefabricated Metal/ Modular building with Gravel storage yard	Prefabricated Metal/ Modular building with Gravel storage yard	Concrete pads for tents
Finance Operations	1,024 SF per base with a 5'x 8' cashiers cage and 8' x 9' vault	Not Authorized	HF/FP Assets (Expandable shelters)	Prefabricated Metal/ Modular building with Gravel storage yard	Prefabricated Metal/ Modular building with Gravel storage yard	Concrete pads for tents
Communications Facilities and Network Control Centers	Each AEW is authorized a Comm and NCC secure compound. Basic allowance guidelines are (Base on population): <1,500 = 2,944 NSF 1,500-3,000 = 4,736 NSF 3,000-5,000 = 6,208 NSF 5,000< = 91,52 NSF	Tents (Tier II/III, may have wood frames and flooring), HF GP Shelters or Expandable Unit; authorized the following: FE6 Compound fence Gravel Parking lot Security Lighting	Tents (Tier II/III, may have wood frames and flooring); authorized the following: FE6 Compound fence Gravel Parking lot Security Lighting	Wood frame structures, portable structures and modular building systems; authorized the following: FE6 Compound fence Gravel Parking lot Security Lighting	Wood frame structures, modular and/or masonry/ prefabricated structures; authorized the following: FE6 Compound fence Gravel Parking lot Security Lighting	Concrete pads for tents

NOTE: *. Squadron operations facilities authorizations replace any per person NSF authorization for admin space for HQ OSS, Weather Ops and Mission Planning.

Table 3.3. AAFES Contingency Facility Requirements Planning Matrix.

Number of Personnel Assigned	Retail Area (sq ft)	Stock Room/ Storage (sq ft)	Number of Food Concessions	Food Court Seating (sq ft)	Laundry/ Alterations (sq ft)	Barber Shop (sq ft)	Beauty Shop (sq ft) Min 250 Female	Retail Concessions (400 sq ft per)	Exterior Bazaar Area
0-1000	4,243	2,090	1	700	250	400	525	1	1,500
1001-1500	6,365	3,135	1						
1501-2000	8,487	4,180	2	1,400					
2001-2500	10,609	5,224	2			800		2	
2501-3000	12,730	6,270	3	2,100			725		
3001-3500	14,852	7,315	3		500				2,500
3501-4000	16,973	8,360	4	2800					
4001-5000	21,217	10,450	4	3500					
5001-6000	25,460	12,540	4	4200		1,000		3	
6001-7000	29,704	14,629	4	4900					
7001-8000	33,947	16,720	4	5600	750		1,080		3,000
8001-9000	38,190	18,810	4	6300					
9001-10,000	42,434	20,889	4	7000					

NOTES:

CE will be required to provide adequate HVAC support for facilities based on **Table 3.2.** construction authorizations.

CE will be required to provide Facility Security (Door Locks) for semi-permanent or modular facilities.

Facilities require 220 volt power for lighting, registers and refrigerators in retail, service and food operations.

Concession may require electrical, ECU and water hookups for initial operations.

Table 3.4. MOB, FOL, and FOB Facility Authorization Guidance.

FACILITY	Main Operating Airbase	Forward Operating Airbase	Forward Operating Location
Roads	YES (Paved primary and secondary)	YES (gravel primary and secondary)	YES (gravel primary and secondary)
DFAC	YES	YES	NO
Billeting	YES	YES	YES
Latrines and Septic Systems	YES	YES	YES
Shower	YES	YES	YES
Office	YES	YES	YES
Warehouse	YES	NO	NO
SCIF	YES	NO	NO
Finance and Personnel Support Operations	YES	YES (operationally defined)	NO
Postal Facility	YES	NO	NO
Laundry Collection/ Distribution Point	YES	YES	NO
Helipad	YES	YES	YES (operationally defined)
Runway and Taxiway	YES	YES	NO
Aviation Fuel	YES	YES (operationally defined)	NO
Squadron Operations Building	YES	YES	NO
Aviation Maintenance	YES	YES (operationally defined)	NO
Communications Compound/NSC	YES	YES (operationally defined)	NO
Medical	YES	YES (Aid Stations)	MEDICS
Vehicle Maintenance	YES	YES	NO
Ground Fuel	YES	YES	NO
Hazardous Waste Collection Point	YES	YES	NO
Hazardous Materials Warehouse	YES	NO	NO
Parking Lots	YES	YES	YES (operationally defined)
Kennel	YES	Operationally Defined	YES (operationally defined)
Morgue	YES	NO	NO
DRMO	YES	NO	NO

FACILITY	Main Operating Airbase	Forward Operating Airbase	Forward Operating Location
Wash Rack	YES	NO	NO
Fire Protection	YES	YES	YES (operationally defined)
Training Facilities	YES	NO	NO
SF Facility	YES	YES	NO
Cold Storage	YES	YES	NO
Chapel	YES	YES	NO
Education Center	YES	NO	NO
Barber/Beauty Shop	YES	NO	NO
Alteration/Pressing Shop	YES	NO	NO
AAFES	YES	YES	YES
AAFES Warehouse	YES	NO	NO
Fitness Center	YES	YES	YES
Field House/Multipurpose Facility	YES	YES	NO
Athletic Fields	YES	YES	NO
Community Activity Center	YES	YES	YES
Multi-Purpose Theater	YES	NO	NO
MWR Warehouse/ Maintenance Facility	YES	NO	NO
AFN Manned Operations	YES	NO	NO
AFN Unmanned Operations	YES	YES	NO
Wing HQ Building	YES	YES	YES

3.6. Facility Construction Standards. **Table 3.3.** provides guidance on the authorized facility construction standards as defined by mission duration and weapons systems requirements. Construction standards are detailed in **Chapter 2** of this volume. The component commander may authorize any construction standard for beddown and bare base construction, as long as it conforms to Air Force programming and funding authorization and guidelines as listed in AFIs 32-1021, -1022, -1023 and **Chapter 6** of this volume.

3.6.1. Billeting Standards. Initial billeting standards for all contingency bases is utilization of host nation facilities, BEAR or Force Provider tentage utilizing the planning factors listed later in this chapter for space requirements. Depending on mission requirements and airbase operational duration, housing may be improved to modular facilities or semi-permanent style dormitories. Theater level CE planning staffs will dictate the level and speed of billeting upgrades based on the CF ACC's mission requirements. It is critical that the theater and contingency base engineers plan for a surge billeting

capability to respond to changes in war plans and base mission requirements. To accommodate population surges/transients, expeditionary airbases will maintain the ability to house 110% of its total normal population at all times. If the base is utilizing temporary or semi-permanent construction standard billets (SEA huts, modulars, etc.) surge capacity may be accomplished through utilization of available BEAR or Force Provider tentage.

3.6.2. Rotary Wing Aviation Facilities. Helicopter landing and parking pads may initially be Stabilized Earth or AM-2 Matting to prevent foreign object damage (FOD). Landing/parking pads will be upgraded to concrete or asphalt with adequate grounding rods and tie-downs. Treat all soil in the immediate area of the pads to reduce FOD. Place HESCO bastions or similar materials around hot arming pads to minimize damage from accidental missile discharge. At a minimum, outfit one helicopter-landing pad on each base camp with landing lights for reduced visibility operations.

3.6.3. Maintenance Facilities Planning Considerations. The responsible component shall provide appropriate aircraft maintenance structures in accordance with the number/type of aircraft supported. Coordinate with theater or deploying Logistics/Maintenance planner for facility requirements.

3.6.4. Medical Facilities Planning Considerations. Develop plans for health clinics, dental clinics and hospitals in coordination with the responsible component Health Facility Planning Office. Design and construct medical facilities in accordance with the responsible operational command's standards. The Air Force has developed multiple deployable medical treatment facilities (MTFs) to treat and evacuate casualties under all conditions. The Expeditionary Medical Support (EMEDS) system is composed of more than 170 equipment and personnel building block UTCs to meet the spectrum of medical response needs. EMEDS is deployed in expandable components and its facilities range in size from four bed holding areas to 114-bed theater hospitals able to treat a population at risk of over 5000 personnel. See Volume 5 of this pamphlet series for detailed civil engineer support requirements for expeditionary medical facilities.

3.6.5. Transportation Maintenance Facilities. The responsible component will design and construct vehicle maintenance facilities. The vehicle maintenance facilities will evolve as the base camp matures to support the mission.

3.6.5.1. Maintenance Facilities. The facility should be equipped with environmental control units and electricity when the operational situation allows.

3.6.5.2. Fuel Truck Parking. Secondary containment pads are required for fuel truck parking. The containment pads will be equipped with a collection sump and grounding rods for parked fuel trucks.

3.6.6. Hazardous Waste Accumulation Points. Construct hazardous waste accumulation points IAW the Overseas Environmental Baseline Guidance Document (OEBGD). Responsible Component Commanders may authorize additional accumulation points as required. Each base will designate a base engineer responsible for all hazardous material management and hazardous waste collection and disposal.

3.6.7. Solid Waste Disposal. Solid Waste Disposal will be in accordance with the OEBGD. The responsible component will authorize the environmentally-appropriate method of disposal of solid waste such as use of incineration or use of landfills.

3.6.8. Fuel Storage. Above ground fuel tanks are authorized for the storage of bulk fuels at long term camps. When fuel bladders are necessary, site them according to the OEBGD.

3.6.9. Munitions Storage Areas (MSA). Construct MSA in accordance with the responsible component's guidance. Munitions storage areas will have containment berms, a fenced and lighted perimeter, graveled access roads and lightning protection. Store ammunition in protective structures that are not in contact with the ground (i.e. on wooden pallets or on concrete foundations).

3.6.10. Kennels. Where military working dogs are authorized for an operation, the responsible component will provide kennel facilities to sustain the operation. Kennel facilities will evolve as the base camp matures to include environmental controls, electrical service and exercise yard.

3.6.11. Mortuary Affairs. Morgues will be in accordance with the standards in Joint Publication 4-06, *Joint Tactics, Techniques and Procedures for Mortuary Affairs in Joint Operations*. Regardless of the type of base camp, privacy screens will be installed around the entire morgue facility.

3.6.12. Distinguished visitor (DV) and guest quarters. Main operations and logistics hub base camps will have DV and guest quarters.

3.7. Utilities. Design utility systems based on current applicable military handbooks, technical manuals and guidance. Refer to **Attachment 3** (Base Camp Development Matrix) for the recommended facilities for each level of base camp development.

3.8. Electric Power.

3.8.1. Electrical Grid Development. As the base camp matures, and where economically supportable and practicable, connect base camp power grids to commercial power. Smaller or remote base camps that cannot be economically connected to a commercial power grid should install central power plants with the capacity to support 125% of the peak electrical demand in accordance with component requirements. During planning phase, give careful consideration to desired electrical system end-state as outlined in the utilities portion of **Attachment 3** (paragraph **A3.36.1.4.**).

3.8.2. When the operational situation does not allow a central power plant, then the base camp will use distributed generators of sufficient capacity to support peak electrical demand loads in accordance with component requirements. Backup generators should be installed within the base camp. The placement, types and numbers will be dependent upon the operational situation.

3.8.3. Considerations for Electrical Grid/Load Planning. In the planning phase for the base camp electrical grid, the electrical load for the following numbers and types of equipment must be calculated to ensure an adequate electrical power supply/grid is constructed:

3.8.3.1. Environmental Control Units (Heating/Air Conditioning).

3.8.3.2. Communications and Automation Equipment. Communications equipment, computers and airfield control measures are critical for electrical load calculation. Ensure planning encompasses charging requirements for battery operated computers and computer base equipment.

3.8.3.3. Dining Facility Electrical Equipment. Refer to theater/base Services planner for detailed load information.

3.8.3.4. Billeting. Deployed AF personnel carry a great deal of electronic equipment not originally planned for under the BEAR deployment concept. It is common for senior enlisted personnel and officers to deploy with personal laptops and other electronic equipment. Ensure these are taken into consideration when outlining electrical requirements. During upgrades, it has become common practice to include small refrigerators, television, VCR/DVD players, game consoles and

computers even in expeditionary tent city environments. The CE planner must be prepared for this level of electrical load as soon as resources and mission effectiveness allow.

3.8.4. Maintenance Facilities.

3.8.5. Force Protection Measures (Exterior Lighting/Electrified Fencing).

3.8.6. Morale, Welfare and Recreation (MWR) Activity Devices and Lighting. Tent cities normally have a central MWR tent that is comprised of television/theater equipment, gaming consoles, increased computer equipment and other functions. Coordination with the theater/base theater planner will enable the CE planner to adequately cover the electrical needs and incremental growth of these facilities during base upgrades.

3.8.7. Civilian Contract Power. Depending on the operational situation, civilian contracts can be used to procure, operate and maintain electrical power as the base camp passes beyond the Expeditionary and Initial phases of development.

3.9. Environmental Control (Heating/Air Conditioning). As the base camp matures, the responsible component will provide environmental control units to supported facilities/units based on operational and environmental needs. The type, method and standard of environmental control will be determined by the following criteria:

3.9.1. Operational situation.

3.9.2. Climate. During OEF numerous northern expeditionary bases in the theater of operation were delivered pallets of ECUS in the late fall months that were unable to produce the heating required (standard Harvest ECUs utilized a heat strip that was only functional to 25 degrees Fahrenheit) while more southern bases went without, even though the daily temperatures were still exceeding 90 degrees Fahrenheit. The CE planner must understand the capabilities and limitations of equipment requested to ensure our limited assets are sourced for the proper location.

3.9.3. Type/function of facility/base camp.

3.9.4. Maturity of facility/base camp. Unless extreme climactic conditions or equipment requirements arise, it does not make sense to waste limited airlift to deploy environmental control units to Initial Standard expeditionary bases (<90 days).

3.9.5. Base camps will utilize existing installed environmental control systems if economically and environmentally feasible.

3.9.6. The following priority list for deployment of environmental control units is provided to assist CE planners in doling out these assets. This list serves as a guideline for both theater planners executing dozens of beddowns or the base planner prioritizing on ground assets for installation. ECUs should be installed in the following priority:

3.9.6.1. Command/Control/Communications and Automation facilities.

3.9.6.2. Medical facilities.

3.9.6.3. Billeting.

3.9.6.4. Dining facilities.

3.9.6.5. Dog kennels.

3.9.6.6. MWR facilities.

3.10. Potable Water Recommendations.

3.10.1. Base Engineers should tie into local municipalities where it is economically feasible, and conditions meet health and force protection standards. The installation of a water purification station should be considered during the initial planning for the base camp and be part of the start up costs for the base camp.

3.10.2. Installation of wells for potable water is recommended. A minimum of two wells per camp, one primary and one back up, within the boundaries of the base camp are recommended. Planning will include the drilling of all wells at the same time to reduce mobilization costs. If economically feasible, plan and install water storage distribution systems. Additional wells may be drilled within the base camp boundaries, if the situation allows, if additional capacity is required.

3.10.3. Well-drilling should be contracted through civilian markets where it is economically feasible and conditions meet force protection requirements. RED HORSE units or Army Combat Engineers have well-drilling capabilities that will need to be requested, sourced and prioritized through the theater engineering planning function.

3.10.4. Transported or bottled water should be used only during the early stages of a contingency operation and should be used as a long-term potable water source only if no alternate sources are available. One major lesson learned by planners is that bottled water places a huge burden on the logistics procurement and theater airlift planners. CE planners need to be aware that the decision to utilize bottled water will result in the loss of daily airlift for other equipment and resources if local suppliers cannot be located and certified to US standards.

3.11. Waste Treatment Plant. The initial assessment for a base camp should plan for wastewater treatment based on a minimum of 110% projected size of the camp to include coalition forces and local nationals. Coordinate with local contracting and environmental offices to determine if connection to a municipal wastewater treatment plant is economically feasible and environmentally sound. Containerized wastewater treatment plants are available through civilian contracts and should be considered when appropriate and connection to municipal plants is not allowed. Expeditionary bases in Northern Iraq were able to source and install a containerized wastewater treatment for under $700,000 in 60 days.

3.12. Personnel Support. Upgrade personnel support facilities to increase support services and provide a safer working environment. The recommended levels of support (as listed in **Attachment 3**, Base Camp Development Matrix) are to apply to all base camps. The level of personnel support will evolve as the base camp matures and operational requirements change.

3.12.1. Dining Facilities. The dining facility may change as the base matures. The long term dining facility will have electric lighting, environmental control units as operationally feasible and adequate electrical connections. If civilian contractors are used, establish an occupational medicine program for health screening. Ensure that local national kitchen staff is provided adequate space for cleaning, latrine and changing areas.

3.12.2. Each base camp will have a nondenominational religious support facility, sized according to the base population. The structure, as operationally feasible, will have electrical lighting, environmental control units and fixed electrical connections. The responsible base commander will provide ade-

quate office space for chaplains to conduct privileged communications, adequate storage space and side areas for private devotions. Coordination with theater/base chaplain planner will further define their requirement.

3.12.3. Fire Protection. The responsible component commander will provide Fire and Emergency Response Services IAW DODI 6055.6 and National Fire Protection Association (NFPA) 403, *Standard for Aircraft Rescue and Fire Fighting Services at Airports*.

3.13. Planned Upgrades. The basic requirement to support mission full operational capability (FOC) within a set timeline determines the AEF facility beddown timelines. Meeting the FOC and beddown timelines (as well as providing an acceptable level of force protection, readiness capabilities, fire protection and critical support facilities) drives TPFDD re-engineering and UTC restructuring. AEF bare base support must be lighter, leaner and faster. The following matrix is provided to assist CE and contingency airbase planners to provide initial requirements for minimum operations. Upgrades from initial to temporary standards should be planned and implemented as soon as mission and resources allow.

3.14. Manpower Utilization and Task Assignment. CE planners need to review anticipated deployment duration and mission requirements to determine the best utilization of limited active duty, AFRES and ANG civil engineer personnel to ensure that the areas where they are deployed and utilized are appropriate for blue suit operations. **Table 3.5.** lists some standard contingency tasks and provides general guidance for potential task execution resources to limit deployed man-days for CE personnel.

Table 3.5. Contingency Task Execution Resources.

Personnel Tasking	EXPEDI-TIONARY < 90 Days	INITIAL <6 Months	TEMPORARY <24 Months	SEMI-PERMANENT < 5 Years	WARM BASE
Solid Waste	Field Incinerator or landfill	Field Incinerator or landfill	Field Incinerator or landfill or civilian contract removal and disposal	Field Incinerator or landfill or civilian contract removal and disposal	Field Incinerator or landfill or civilian contract removal and disposal
Medical Waste	Field Incinerator	Field Incinerator	Incinerator/ Civilian Contract removal and disposal	Incinerator/ Civilian Contract removal and disposal	Incinerator/ Civilian Contract removal and disposal
Hazardous Waste	Removal from Site to central collection location	Removal from theater IAW OEBGD	Civilian Contract removal and disposal	Civilian Contract removal and disposal	Civilian Contract removal and disposal
Facility Engineers	Military Engineer Units	Military Engineer Units	Military Engineer Units or Civilian Contract	Military Engineer Units or Civilian Contracts	Military units transferring to Civilian Contracts
Fire Fighting	Military Fire Fighters	Military Firefighters	Military or Contract Civilian Fire Fighters	Military or Contract Civilian Fire Fighters	Civilian Fire Fighters
Snow Removal	Military Units	Military Units	Military or Civilian Contract	Military or Civilian Contract	Civilian Contract

3.15. Air Force Basic Expeditionary Airfield Resources (BEAR). BEAR UTCs are aggregated into sets or packages that provide ECS capabilities. Note that sets may be further broken down into sub-UTCs or involve less than full-set deployments. Bare base equipment allowance standards are found in AS 158 (Harvest Falcon); AS 159 (Harvest Eagle); AS 157 (BEAR); and AS 429, Part N for training assets. Below is a brief description of current BEAR sets. For a more detailed description of the set contents refer to Volume 5 of this pamphlet series and AFH 10-222 Volume 2.

Figure 3.2. Typical BEAR Tent City.

3.15.1. BEAR 150 Housekeeping Set (also known as Swift BEAR). The set supports a maximum of 150 personnel for approximately five days. Sets include austere shelters, field latrine for basic hygiene, 60kW generators, power distribution panels, environment control units (ECU), light carts, and forklift support.

3.15.2. BEAR 550 Initial Housekeeping Set. These sets contain bare base assets for billeting, power production/distribution, water distribution, messing capability, hygiene, camp lighting and environmental control. The BEAR 550I can be tasked in one of two ways, either as a parent UTC or by any combination of its sub-UTCs. The BEAR 550I also includes expeditionary combat support infrastructure such as chapel, CE/base maintenance facilities and tactical field exchange. BEAR 550 sets include assets sufficient to support 550 personnel.

3.15.3. BEAR 550 Follow-On Set. These sets augment the 550 Initial set and include additional billeting, hygiene, power production/distribution, water distribution, camp lighting and environmental control.

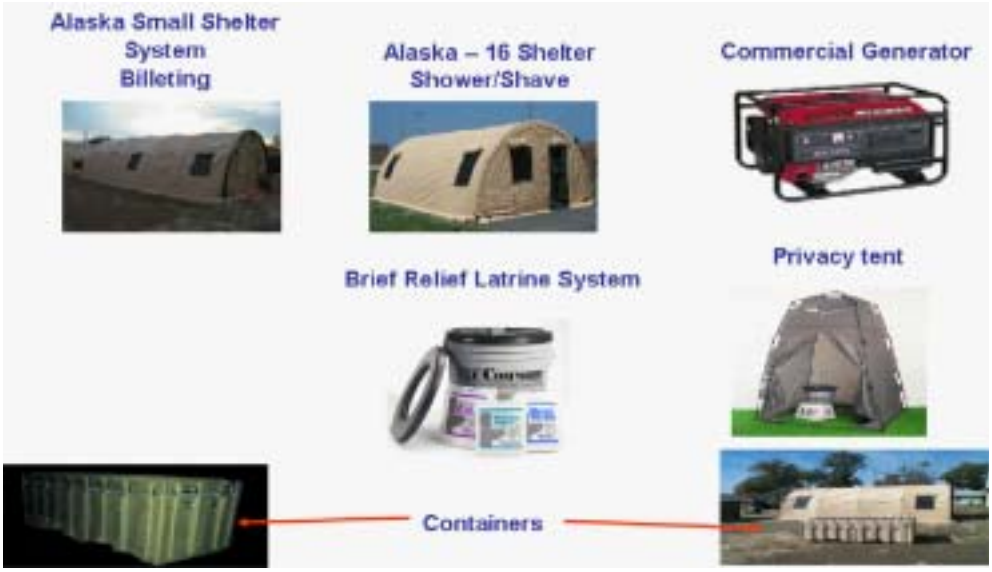
3.15.4. BEAR Industrial Operations Set. An infrastructure set that provides various sized shelters as facilities for supply, CE, vehicle operations/maintenance, packing and crating, etc. This package supports up to 3,300 personnel (e.g. six BEAR 550 housekeeping sets).

3.15.5. BEAR Initial Flightline Set. The set provides initial flightline support for one squadron of fighter aircraft. The assets include aircraft hangars, avionics shops and general purpose functions. The set also provides additional power production, latrines and ECUs.

3.15.6. BEAR Follow-on Flightline Set. This set supports an additional aircraft squadron by adding an additional aircraft hangar and medium sized shelters for power/non-powered aircraft generation equipment (AGE).

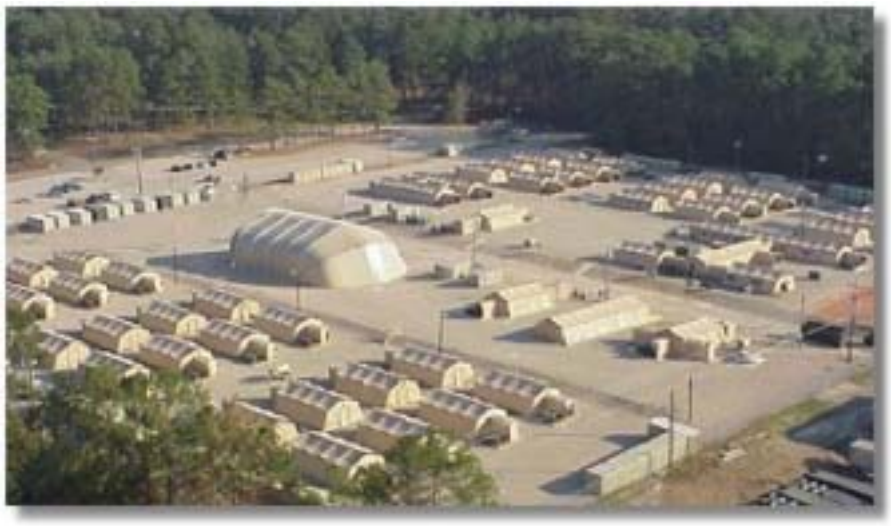
3.15.7. BEAR has additional **optional** UTCs for deployment on an as needed basis. There are 16 major UTCs available including Reverse Osmosis Water Purification Units (ROWPU), self-help laundry, concertina wire, water system freeze protection, desert camouflage nets/poles, AM-2 matting, emergency airfield lighting and mobile aircraft arresting systems.

Figure 3.3. BEAR 150 (Swift BEAR) Assets.



3.16. Army Force Provider Resources. Force Provider is the Army's base camp support system, similar to the Air Force BEAR system. Force Provider was de veloped in response to lessons learned from the 1991 Gulf War. During Operation De sert Storm the Army realized that its base beddown and operating support facilities contained only rudimentary messing and hygiene facilities and actually hampered mission accomplishment and troop morale.

Figure 3.4. US Army Force Provider Set.



3.16.1. The Force Provider (FP) mission is to give frontline soldiers a respite from the rigors of duty. Each Force Provider Company consists of six platoons which can support 550 soldiers separately. Combining all six modules allows support for 3,300 soldiers. The modules can operate as stand-alone beddown or as a modular and scalable tent city to support as large a deployment as assets are available. Each 550+ module provides the following:

3.16.1.1. Climate controlled billeting for 600 personnel (550 soldiers and 50 FP maintainers).

3.16.1.2. Food preparation and service capabilities for 1,650 A-ration meals per day.

3.16.1.3. Showers (24 stalls with water for 10 minute showers per person per day) and latrine facilities (24 toilets, four urinals and eight sinks).

3.16.1.4. Containerized laundry system capable of 200 pounds of laundry per hour.

3.16.1.5. MWR Facilities.

3.16.2. FP sets are containerized for transport via land, sea or air, military or civilian movement. A 550+ FP set is packaged in 103 TRICONS (Three ISO Containers).

Figure 3.5. Force Provider Containerized Latrine and Shower Facilities.

3.16.3. A 550+ module requires the following consumable resources:

3.16.3.1. 90kW of continual power that can be provided by organic FP generator capabilities.

3.16.3.2. Module generators require 3,137 gallons of JP8 fuel per day.

3.16.3.3. 150 gallons of standard MOGAS per day.

3.16.3.4. Production/distribution infrastructure for 25,000 gallons of potable water per day.

3.16.3.5. Storage and distribution capacity for 40,000 gallons of grey wastewater per day.

3.16.3.6. Storage/treatment and/or removal of 3,000 gallons of black wastewater per day.

3.16.3.7. Solid waste/refuse disposal.

3.16.4. Set-up for the 550+ module requires the following:

3.16.4.1. 10-15 acres of land (dependant upon terrain and security posture).

3.16.4.2. Site preparation, utilizing a combat heavy battalion, to produce a level, graded site (5% of less grade), access roads, security berms, equipment yards and storage aprons require the following time:

3.16.4.2.1. Good Location. Expect forty eight (48) hours for site preparation, eight (8) days for erection. A good location is defined as a site with flat terrain, limited ground cover/brush, stable soil, existing roads and adequate site drainage.

3.16.4.2.2. Fair Location. Expect seventy-two (72) hours for site preparation, nine (9) days for erection. A fair location is defined as a site with uneven terrain, lots of underbrush and trees, partially stable soils, some roads and moderate drainage work required.

3.16.4.2.3. Poor location. Expect ninety-six (96) hours for site preparation, 10 days for erection. A poor location is defined as a site with rough, hilly terrain, dense underbrush and trees, no roads, unstable soil and extensive grading required for site drainage.

3.16.5. The erection, maintenance and sustainment of the Force Provider set requires the following:

3.16.5.1. Appropriate elements of the corps or theater Army for finance, legal, personnel, administrative services, security and supplemental transportation support

3.16.5.2. A heavy combat engineer battalion (or Air Force, Navy or contract equivalent) for site preparation.

3.16.5.3. An Engineer fire fighting team (or other service equivalent) and fire truck for structural responses.

3.16.5.4. A utilities team for utilities operations.

3.16.5.5. A Quartermaster supply company for potable water.

3.16.5.6. A resident unit ministry team for religious support to attached units.

3.16.5.7. An Engineer prime power battalion for power generation support.

3.17. Navy Camp 750 Resources. Navy Camp 750 sets provide complete living facilities and expeditionary combat support to 750 personnel. Details are listed in **Table 3.6.**

Table 3.6. Air Force, Army and Navy Basic Beddown Sets.

US Air Force	US Army	US Navy
BEAR 550 Housekeeping Set (550 Person Set)	**Force Provider (550 Person Set)**	**Camp 750 (750 Person Set)**
Stand alone warm-weather, personnel support package	Assembled by task-organized Quarter master Company	Provides complete living facilities for 750 personnel (75 Officers, 613 enlisted, 62 person complement)
Setup varies depending on mission. Typical PRIME BEEF complement of Lead and Follow team can achieve initial operational capacity (IOC) within 72-hours.	**Setup** of standard module: 63 personnel take 120 hours to complete (varies depending on required site preparation, climate, lay down configuration and personnel experience levels.	**Setup** (initial) within one day, followed by additional improvements over 2-5 days.
Billeting Subsystem	**Billeting Subsystem**	**Billeting**
Small Shelter System/TEMPER (48)	TEMPER Tents (44)	GP Medium Tents (62)
Environmental Control Units (72)		
Admin Facility Subsystem	**Admin Facility Subsystem**	**Admin Facilities**
Small Shelter System (4)	TEMPER Tents (6)	GP Medium Tents (3)
		GP Medium Tents (1) – Dispensary
Shower Subsystem	**Shower Subsystem**	**Shower**
Small Shelter System (2)	TEMPER Tents (6)	12-head shower unit (6)
6 stalls w/2 shower heads ea/12 sinks (2)	Portable shower/shave stands	
	M-80 Water Heater (1)	
Laundry System	**Laundry System**	**Laundry**
Self-Help Laundry (optional)	Portable Water System (1)	Container ISU 90; washer/dryer (2)
	Blackwater Containment (1)	Modular GP Tent (2)
	3,000 gallon storage tank and pump (optional)	
Latrine	**Latrine**	**Latrine**
Small Shelter System (2)	Containerized Latrine	4-hole burnout head and Latrine (15)
Field Latrine w/6 seats & 2 sinks (2)	24 toilets, four urinals and eight sinks	
Water Storage/Distribution System	**Water Storage/Distro System**	**Water Storage/Distribution**
550-person Water Distribution System (1)	20K-gal collapsible tank (4)	Waste Water Leach Field (3)
20K-gallon Water Bladder (2)	Pressure tank assembly	Sanitary Sewer, 300’ (7)
3K-gallon Water Tank(5)	400-gal tank with mobile chiller (4)	Water Treatment Unit (2)
	Expansion Tank Assembly (4)	Water Storage (30K-gal) (2)

US Air Force	US Army	US Navy
BEAR 550 Housekeeping Set (550 Person Set)	**Force Provider (550 Person Set)**	**Camp 750 (750 Person Set)**
	Hyperchlorination Unit (4)	Water Distribution Line, Portable (2)
Food Service	**Food Service**	**Food Service**
550 Kitchen (SPEK) (1);	TEMPER Tent (4)	Bakery Plant Field Portable Tent (1)
Medium Shelter (Messing Facility) (1)	600-cf Refrigerator (2)	GP Medium Tent – Garbage Storage (1)
	Convection double-oven (2)	Field Mess Galley (1)
	Stand-mounted griddles (2)	
	30-gallon braising pan (2)	
	20-gallon steam kettle (2)	
	5-Pan Opening Steam Tables, equipment and accessories (2)	
Power Generation and Distribution	**Power Generation**	**Power Generation**
Generator, 30kw, MEP-805 (2)	Tactical Quiet Generators (3)	Power Plant, 2-60kW w/fuel tanks (1)
Generator, 60kW, MEP-806 (3)	500-gal collapsible tank w/liner	Electrical Distribution Line (11)
Generator, 920kW MEP-PU-810A (2)	Power Gen/Distro System (1)	Power Distribution Center (18)
Primary Cable Skid (2)		
Secondary Distribution Center (10)		
Primary Switching Center (1)		
Light Cart (2)		
Bulk Fuel Storage/Distribution	**Bulk Fuel Storage/Distribution**	**Refueling/Maintenance Facilities**
Fuel bladder, 10,000-gal (2)	10K-gal collapsible tank (2)	3K gallon pillow tanks/filling station (2)
	Berm liner assemblies (2)	Maintenance Facilities (FSTFS) (1)
	Fuel Spill Kit	Storage/Supply (40’ x 100’) Tent (1)
	500-gallon Drum (12)	
	Forward Area Refueling Equipment	
Base Support/MWR Facilities	**MWR Facilities**	
Small Shelter (7)	TEMPER Tents (3)	
Mortuary	**Gray water Collection System**	
Small Shelter System (1)		
Camo Nets/Pole Sets (2)		

Chapter 4

BARE BASE UTILITIES DEVELOPMENT

4.1. Overview: The provision of water, electricity and removal and treatment of wastewater are critical to the success of deployed military operations and AF CE mission requirements. This chapter will outline some general utility issues. Greater detail on planning and installing deployed utility systems is outlined in AFPAM 10-219 Volume 5 and AFH 10-222, Volume 1.

4.2. Problems and Solutions. Recent bare base operations during OAF, OEF and OIF have highlighted a number of utility limitations and challenges faced by deployed expeditionary engineering units. Theater and unit level engineer planners and leadership can alleviate many of these problems by understanding the cause and effects of these limitations.

Figure 4.1. Typical BEAR Utility Assets.

4.3. Potable Water. During Operations Southern and Northern Watch deployed USAF personnel and base camp operations used bottled water as the primary source of potable water for personal consumption. This evolution from production-based potable water supplies resulted from very liberal assistance-in-kind (AIK) agreements between the Gulf States of Kuwait, Turkey and Saudi Arabia and Air Force personnel operating within the theater. In these agreements, the host nation agreed to supply numerous consumable resources to include potable water at no charge to the US government. As personnel rotated through the CENTAF AOR, bottled water became part of the understood deployable concept of operations. This dependency upon bottled water caused a number of problems during OEF and OIF.

4.3.1. Water supply for the personnel at an OEF base in Afghanistan was provided by bottled water flown in from central supply points in Qatar and Kuwait. Two months into the mission with over 1,000 personnel on the ground, the CE water shop was treating 15,000 gallons of city water per day. The base utilized the treated water for laundry, dining, cleaning and hygiene requirements but would not utilize it for personal consumption. The treated city water was rated safe by the base Bioenvironmental Engineer yet the base was still flying inroughly 10,000 bottles of water per day to support base personnel. This consumed critical airflow for other mission assets since water was always prioritized at the top position for intra-theater airlift.

4.3.2. While experiencing shortfalls in engineering heavy equipment, maintenance supplies and quality of life improvements, the base was losing approximately two C-130 flights per day to the mindset that AF personnel must drink bottled water. Since this mindset was prevalent at over 17 expeditionary bases in the AOR it had a significant effect on available airlift. Mission requirements eventually led to many bases, such as Bagram, Kandahar, and Jacobabad to switch over to ROWPU treated water for consumption when the base population surged beyond the AF's ability to purchase, marshal and ship enough bottled water to support base populations in remote areas.

4.3.3. Theater engineering planners need to be ready to advocate for the judicious use of bottled water for initial operations and conversion to other sources as quickly as possible to increase overall mission effectiveness.

4.4. Latrine/Sanitation Facilities. Poor sanitation and hygiene has significantly impacted military campaigns throughout history. Figure 4.4 shows examples of latrine facilities used by Air Force expeditionary forces during the OAF, OEF and OIF. Many of the austere and initial standard facilities were utilized for extended periods while theater level planners attempted to source and transport Harvest Falcon or Force Provider assets to alleviate conditions that did not meet minimum AF operating and hygiene standards.

Figure 4.2. Expeditionary Latrines during Contingency Operations.

4.4.1. In this day and age of modern technology airlift and continued improvements in bare base asset technologies, AF expeditionary engineers can still expect to be faced with a wide-range of sanitation and latrine options while bedding down US and coalition troops. Numerous bare base beddowns during OAF, OEF and OIF required USAF engineers to construct field expedient latrines, urine trenches, latrines with burnout pots and other creative solutions to handle a very real sanitation problem.

4.4.1.1. Base engineers need to ensure that they focus on completing basic expedient latrine and sanitation construction techniques during field exercises, and ensure personnel understand the importance of planning for and marking the location of waste collection areas, slit trench locations and other waste disposal areas to ensure future excavation does not expose these areas.

4.4.1.2. Shower Facilities. Although very important to hygiene, sanitation and quality of life, shower facilities do not represent the critical requirement that latrines do. Recent operations have shown that shower/shave kits will be bumped by higher priority assets for daily intra-theater airlift. Deploying AF engineers should plan for the requirement to construct a field expedient shower facility with limited Class IV material available on the local market. If showers are a high priority of your deploying team, the engineers need to pack for it.

4.4.2. Deployed units often experienced host nation (HN) infrastructure limitations when attempting to expand base facilities for new missions and the associated infrastructure required: sewage treatment and gray water disposal, solid waste management programs. These types of limitations are greatly improved where the US and HN force have created a favorable political climate that creates opportunities for service contracts, land leases and utility supplies. The CE planner must take local economy, political relations and other outside influences into consideration when trying to solve the problem. Normal deployment systems/methods for sewage treatment and waste disposal may not be possible when an existing airfield is used for an AEF deployment. Surrounding populations and structures may simply prevent some expansions and existing utility systems may already be overtaxed or incapable of handling the additional load from a small military city dropping in on their doorstep.

4.4.3. Deployment planning may have to consider use of purchased or leased package treatments systems, construction of intermediate holding tanks to allow storage of sewage and wastewater for removal to a more remote treatment site and construction, repairs and upgrades to an existing utility system before tying into it. AF CAP (or other contract augmentation programs) may be required to provide resources and labor or RED HORSE may be required to construct large tanks or bury pipelines.

4.5. Electrical Development: Development of electrical requirements, upgrades and planning factors can be found in AFPAM 10-219 Volume 5.

4.6. Conclusion. Air Force engineers, planners and deployed personnel need to address sanitation and hygiene requirements early in the planning and beddown process. Silver Flag and CE training focuses on the importance of this, yet we often still fall short in real world deployments. Historically during deployments, more personnel require medical assistance due to sanitation related illnesses than due to combat injury.

Chapter 5

SECURITY AND FORCE PROTECTION DEVELOPMENT

5.1. Overview. Security and protection of Air Force assets in an expeditionary location is of critical importance to all organizations on the base. Although the Security Forces Commander operates the base Force Protection plan, it cannot be accomplished without active participation of CE planners and craftsmen. AEF planners should have more information/intelligence on location threats when planning for deployments to austere locations when compared to standard bare bases. Austere, forward locations are usually much closer to battle areas or areas of heightened terrorist threat. Units that deploy will have much more to consider when they arrive on station and some of their initial actions may include verifying the threat situation rather than starting site layout. Consider the following subjects when you deploy to higher threat areas.

Figure 5.1. Security Forces Providing Perimeter Security.

5.2. Force Protection Planning. For civil engineers, force protection roles and responsibilities have varied greatly since 1950.

5.2.1. During the Cold War, the Air Force CONOPS was to operate from established main operating bases with hardened shelters and facilities, as well as numerous buildings with chemical overprotection. Army personnel surrounded these bases for grounddefense and air defense with Patriot batteries. Depending on the theater, the threat ranged from attack by enemy special operations forces and saboteurs, larges scale air and ground attacks and conventional and chemical missile and rocket attacks. Security force protection ranged from fortified bunkers, robust perimeter security and alarmed facility and base access.

5.2.2. During Operation Desert Storm the Air Force was able to activate some bases with Royal Saudi Air Force (RSAF) hardened facilities and chemical protection. The majority of Air Force operations were conducted from bare base, expeditionary airfields with Harvest Falcon systems or temporary shelters, which were not chemically protected. Army forces and resources were still utilized to provide ground defense and anti-aircraft/anti-missile air defenses for AF bases. Rudimentary facility hardening was accomplished with sandbags, concrete barriers and various constructed revetments. Due to air and naval superiority, the major threat became chemical and biological attacks by missiles and terrorists, as well as conventional attacks by terrorists. Enemy special force units and teams were

still a threat, but they had limited long-range capability to attack most bare bases. AF Security Forces personnel created force protection plans based on multiple fighting positions, roving patrols and mobile alarm systems. Chemical, biological and radiological detection was still relatively rudimentary utilizing passive monitoring systems (M-8/M-9 tape) and often fell to Readiness teams that were ill-equipped, lacked the adequate situation intelligence and resources to adequately protect in what could have been a significantly contaminated environment.

Figure 5.2. PSAB Airbase (Before and After Buildup).

5.2.3. Recent AEF deployments have relied on Harvest Eagle and Harvest Falcon assets, along with Army Force Provider assets. Revetments have ranged from expedient sandbag to Concertainer systems. Weapon threats tend to be grenades, mortars, mines, rockets and missiles; shoulder fired anti-aircraft missiles and small cannons. While the threat is usually from explosives, there is the chance that chemical or biological agents could be used in war heads or even in ground dispersal devices. Force protection is a major concern when there is a high probability of terrorist, saboteur, or insurgent attacks, especially when the planned bare base airfield is at an existing commercial airport near a town. When airfields are surrounded by populated areas, it forces in- and outbound aircraft to fly over towns and there is a greater threat of a successful shoot down of coalition aircraft.

5.2.3.1. Force protection plans for expeditionary airbases (EAB) of this type should consider the use of defensive fighting positions, roving patrols, remote area detection alarms and other measures to secure the flightline and the surrounding area to the greatest extent possible.

5.2.3.2. Large frame aircraft used for troop rotation and resupply are easier and more inviting targets to enemy forces and their protection places an even greater strain on our security forces personnel. Fighting positions must be used along with portable alarm systems and detection fields. Protective measures and patrols must be extended as far past the runway clear zones as possible to prevent targeting of the slower, heavier aircraft on approach and take off.

Figure 5.3. Expeditionary Airbase in Afghanistan.

5.2.4. Civil Engineer and Security Force planners must coordinate force protection requirements, help establish protection zones, reinforce fighting positions, clear or establish obstacles and harden the perimeter in some locations to ensure maximum utilization of resources. Beddown and planning should take into account the force protection needs at their inception to prevent problems during execution. It may be necessary to construct berms and revetments around critical assets and to bury or cover utilities.

5.2.5. AEF deployments for OEF experienced planned and unplanned growth, which required additional land and resources. Every change that increases the base footprint usually requires changes and extensions to force protection measures. Some areas with exposed fuel transfer pipelines may have to be buried or placed between berms or shallow trenches to provide additional protection. The same holds true for utility lines. While electrical cables should normally be buried, if host nations prohibit burying or the ground surface is solid rock, then you should plan to berm and cover or bring in soil and cover these utilities (except at road crossings where these utilities should always be buried).

5.2.6. When there is a higher risk of terrorist attacks or sabotage, protection of water transfer lines becomes a concern. In the past, a major concern related to chemical attacks has been the introduction of agents into a municipal water supply used by deployed forces. However, there is also a threat to water produced by ROWPUs and stored in tanks. Due to the ready availability of waterline hot-tapping tools, PVC or soft/ductile water transfer pipes can be tapped under pressure within minutes. Then a chemical poison or biological agent could be introduced with a hand pump. Provide planning assumptions for protective measures such as roving patrols and/or burying the lines, especially for any areas that are not readily observable.

5.2.7. To meet the threat of an airborne chemical attack, planning should also consider whether additional areas of the base will have to be cleared to create safe areas for contamination control areas (CCA). Planners should consider possible approach/departure routes for the base and CCAs based on the topography and prevailing winds. Planners should understand that open areas, which can be used as potential CCAs, may further limit the available land on a base. If this is the case, notify theater

planners that contingency real estate support teams (CREST) or theater contracting officers may have to take action to lease additional land prior to deployment.

5.3. Classification of Threats. CE planners need to be able to characterize and define the various threats faced in an expeditionary location to greater partner with the force protection planning group at both the theater and base level. The Air Force has developed a matrix to define the varying levels and threats posed to an expeditionary airbase (**Table 5.1.** and **Table 5.2.**). Greater detail on these and other potential NBCC threats may be found in AFMAN 10-2602 Chapter 2, Sections 2-4 through 2-12.

Table 5.1. EAF Airbase Threat Matrix.

	Low Intensity EAF Threat Level I	**Medium Intensity EAF Threat Level II**	**High Intensity EAF Threat Level III**
Ground	Irregular forces Terrorists Penetrating threats	Military Special Ops Sabotage Standoff/Long range munitions threat	Regular Infantry Assault
Air	Conventional Airdropped munitions	Enemy offensive counter-air operations	Theater Ballistic Missile (e.g. SCUDs)
Chemical/ Biological	Contamination of food & water	Localized Chemical Warfare (CW) agent contamination	Base wide CW contamination
Information, Command & Control	Physical and virtual attack on IT systems, networks and connectivity	Disruption of reach back capability and computer connectivity (SIPR and NIPR)	RadioFrequency Weapons Hack of the Network Disabling of Networks

Table 5.2. Airbase Defense Threat Levels.

Threat Level	**Example**	**Response**
I	Agents, Saboteurs, sympathizers, terrorists	Airbase, wing and unit self-defense and force protection measures
II	Small tactical units, unconventional warfare forces, guerilla groups	Airbase, wing and unit self-defense force protection measures with supporting fire from larger combat units
III	Large conventional tactical forces, to include airborne, heliborne and major air operations	Requires support of tactical size combat forces dependent upon threat

5.3.1. Low-intensity ground threats include utilization of guerilla style tactics by conventional or non-conventional military forces (terrorists, insurgents or military) to penetrate base perimeters and disrupt operations or cause loss of AF personnel or resources. The best defense against a low intensity ground threat is utilization of a large and mobile security forces presence to provide monitoring of the base perimeter and controlling base access. Through a number of AF Battle Lab initiatives, the AF has

developed a number of electronic upgrades to equip the roving patrols and augment perimeter security. These initiatives include, but are not limited to, the Tactical Automated Surveillance System, night vision technology, perimeter fence movement detectors, perimeter cameras with central control and monitoring, and lighter armored vehicles and body armor. The theater and base SF Force Protection Cell will be able to provide additional information to the CE planner regarding equipment in use and required CE support of construction and infrastructure to support FP initiatives.

Figure 5.4. Infrared Sensor Security System Installed on Base Perimeter.

5.3.2. Medium-intensity ground threat includes the utilization of enemy Special Operations Forces (SOF), paramilitary, specialized terrorist organizations that attempt base penetrations and operations disruption through direct attack or standoff weaponry (mortars, rockets, rocket propelled grenades) launched from outside the base perimeter. This type of threat is very difficult to defend against since the primary methodology is to attack from beyond the perimeter fence where US forces may or may not have authority to engage. Current procedures require the base to work closely with host nation security and military agencies to provide beyond-the-fence surveillance and around the base (1,200 foot desired) standoff, clear zone to minimize the impact of standoff weapons. CE personnel may be called upon to erect counter-mobility berms, install concrete barriers and assist with the construction of over watch positions and towers. The AF Force Protection Battle Lab is looking into the potential of fielding other assets to enable the SF personnel to better counter this threat. Contact you base force protection cell for information.

Figure 5.5. Surveillance from Over Watch Tower.

5.3.3. High-intensity ground threats are large scale, organized terrorist or enemy military forces (normally brigade size or larger) attacks on an airbase. While low and medium intensity ground threats are the responsibility of the assigned base personnel, high-intensity threats will normally require the deployment of additional forces to counter the threat. Baghdad International Airport during Operation Iraqi Freedom was a high-intensity threat area that evolved into a medium threat area. The AF was collocated with an Army brigade to provide greater security and alleviate the threat.

5.3.4. Low-intensity air threats are found in slow-moving unmanned aerial vehicles (UAV) or suicide remote controlled aerial bombs (small remote controlled airplanes, rockets etc). When these are paired with GPS guidance systems, they become especially lethal. These UAV delivery systems can be armed with a series of sub-munitions, cluster bombs and conventional weapons, chemical/biological systems that pose a serious threat to successful mission and airbase operations. Base planners should strive to increase intelligence collection and coordination, SF interaction with air traffic control (host nation and coalition). Base CE and SF need to have an adequate bunker and emergency alarm plan to counter the potential impact of this type of weaponry.

5.3.5. Medium-intensity air threat covers the realm of standard military or terrorist aerial bombing operations. In this type of environment, base CE and SF need to have an adequate bunker and emergency alarm plan to counter the potential impact of this type of attack. Current AF doctrine requires the AF to establish and maintain theater air superiority to counter this level of threat.

5.3.6. High-intensity air threat encompasses theater ballistic missiles (SCUDS, intermediate range ballistic missiles, etc.). The majority of enemies who will possess this technology will be severely hampered by poor guidance and limited stocks. The base should be prepared to defend against and survive lucky hits of conventional or NBC warheads. The base CE and SF need to have an adequate bunker and emergency reaction plan to counter the potential impact of this threat.

5.3.7. Low-intensity NBC threats encompass the potential of chemical or biological contamination of base water and food supplies in an effort to sicken or kill the base population and disrupt mission operation. Current AF operations utilize vaccinations, antibiotics, preventative health maintenance to counter the effects of contamination. Bases should maintain an emergency supply of bottled water and meals-ready-to-eat (MREs) as a backup in the event of contamination. Base food and water stocks can

be resupplied within a matter of days so stockpiles do not need to beextensive. Base CE water production specialists and Biomedical Engineering personnel are responsible for continual testing of the base water source.

5.3.8. Medium-intensity NBC threats are defined as the localized release of NBC warfare agents with the intent to immobilize, destroy or degrade US operations. Localized release means the attack contaminates parts of a base but falls short of affecting the entire airbase, resulting in the current split-mission oriented personal protection (MOPP) concept of operations at AF bases worldwide. As the primary resource for readiness reporting the CE planners must relay heavily on the expertise and experience found in the CE Readiness Flights to alleviate this threat. Intelligence, remote sensors, emergency response planning and adequate personnel bunkers will assist in minimizing the impact of this threat.

5.3.9. High-intensity NBC threats are defined as an attack that causes base wide contamination by NBC agents. As the primary resource for readiness reporting the CE planners must relay heavily on the expertise and experience found in the CE Readiness Flights to alleviate this threat. Intelligence, remote sensors, emergency response planning and adequate personnel bunkers will assist in minimizing the impact of this threat.

5.3.10. Low-intensity command and control/intelligence, surveillance and reconnaissance (C2ISR) threats are physical attacks on information, C2 and communications systems infrastructure. To defend against this, CE, Communications and SF planners need to ensure that key nodes, distribution centers and relays are installed in the most secure method available. Host nation coordination may be required for underground installation.

5.3.11. Medium-intensity C2ISR threats are defined as attacks to deny expeditionary forces access to reach back data and planning capabilities, connectivity to higher headquarters, intelligence organizations, surveillance, and hacking of US government computer systems by insurgent forces.

5.3.12. High-intensity C2ISR threats are defined as the disruption or destruction of C2ISR systems through the utilization of electrical or radio waves.

5.4. Security Forces Base Defense CONOPS. Engineers need to understand the defensive CONOPS of the AF Security Forces to better support physical security requirements. The primary item for AF CE planners to understand is that AF SF CONOPS dictate that the AF will be responsible for the tactical area of responsibility (TAOR) and perimeter fence in, while security of the area outside of the base will fall to other agencies. The following postures are included in AFPD 31-3, *Air Base Defense*.

5.4.1. During periods of low or mid-level threats (Levels I, II and III), airbase defense forces are primarily responsible for protecting the force from attackers attempting close attack by penetrating forces and from standoff attack within the TAOR. The TAOR is the area, which the defense force commander can control through organic heavy/light weapons fire. The Air Force component will ensure adequate support is available from the other joint components, host nation, coalition, allied forces, and civilian authorities to meet surveillance and denial needs, such as for the stand-off threat beyond the capabilities of the Air Force.

5.4.2. During periods of high-level threat (Level III), airbase defense forces rely on a tactical combat force (TCF) comprised of other US service components, allied, coalition, or host-nation forces to ensure the survivability of airbases.

5.4.3. Outside the airbase TAOR, US Army, USMC, host nation military forces, or civilian law enforcement agencies will have responsibility for security requirements.

5.4.4. US, host-nation, coalition, and civilian law enforcement/security forces will be incorporated into airbase defense planning and operations to the fullest extent possible.

5.5. Force Protection and Safety. Antiterrorism force protection and physical security in the expeditionary environment present unique challenges to planners, engineers and security forces. The threat type, severity, and desired level of protection are the primary considerations when selecting AT/FP and physical security measures. These considerations will be used to identify vulnerabilities, reduction measures, and the siting of facilities. In the expeditionary environment, important security planning factors include: availability of existing facilities, types of structures, existing natural or man-made features, types and quantity of indigenous construction materials, available real estate, and other base infrastructure. Pre-existing buildings will be renovated to meet DOD, AF , and CFACC force protection and security standards. These standards will provide guidance to design strategies for mitigating the effects of specific aggressor tactics, defined levels of protection, and effects on building costs of applying those measures. Some specific force protection measures are as follows.

5.5.1. Perimeter. Chain link or concertina fences will be employed on the camp perimeter. Whenever possible, berms and sniper screens will be used to block direct visual access from outside the base perimeter. Lighted gravel perimeter roads should be installed inside the perimeter berm. Surveys to assess alternate access routes should be completed with focus on culverts underneath the perimeter fence. Culverts should be caged, or otherwise blocked to prevent personnel entry.

5.5.2. Gates. Main gates with covered inspection areas are authorized if required by the operational situation. Barriers will be built to enable the blockage of large vehicles. Gate Guard Shacks should be equipped with lighting and environmental control units. Tilt bar and swing gates are authorized. Place weapons clearing barrels inside the gates.

5.5.3. Primary Gathering Facilities. Construct barriers to minimize car bomb threats. Use HESCO bastions, Jersey barriers, or other methods capable of stopping a car or truck. Fence the air conditioning intakes to reduce the terrorist threat of introducing gas into duct systems.

5.5.4. Water Sources. Water plants, wells, storage tanks, and bladders will be fenced if a threat to these facilities exists.

5.6. Minimum Force Protection Design Standards. The most cost-effective solution for mitigating the effects of an attack is generally to provide distance between facilities and any explosions that might occur. Unified Facilities Criteria 4-010-01 provides planning standards for expeditionary and temporary structures, including minimum antiterrorism standards for expeditionary and temporary structures. As is the case for fixed facilities, the type and severity of the threat along with the desired level of protection will be the primary considerations in the selection of the anti-terrorism force protection and physical security measures. These considerations will affect decisions on various issues such as the types of vulnerability reduction measures and the physical layout of facilities, facility groups and infrastructure. Important factors in planning security measures in the expeditionary environment include the availability of existing facilities, the type of structures in which people live and work, existing natural or man-made features, type and quantity of indigenous construction materials, available real estate and layout of utilities and other base infrastructure. The standards in UFC 4-010-01 for minimum standoff distances apply to all

new and existing expeditionary and temporary structures and is more in depth and has precedence over guidance outlined in this pamphlet.

5.6.1. Facility Access.

5.6.1.1. Select sites away from public roads or other uncontrolled areas.

5.6.1.2. Maximize use of natural or man-made features to obscure vision from potential threat vantage points.

5.6.1.3. Limit vehicle approach speeds.

5.6.1.4. Minimize vehicle access points.

5.6.1.5. Provide an entry control point with a well defined holding area for unauthorized vehicles and vehicles being searched. The holding area should be outside of prescribed minimum standoff distance.

5.6.1.6. Separate functional areas requiring frequent vehicle access (e.g., kitchens, industrial areas, retail areas, refuse collection points) from billeting areas.

5.6.2. Site Characteristics.

5.6.2.1. Maintain good housekeeping by keeping areas within 30 feet of shelters or structures free of items other than those items that are part of the infrastructure.

5.6.2.2. When possible, position exterior doors so they cannot be easily targeted from the installation perimeter or uncontrolled vantage points.

5.6.3. Facility Standoff/Separation. Standoff distances are defined as the distance maintained between a building or portion thereof and the potential location for an explosive detonation. Standoff distances are based on the assumption that a controlled perimeter will create an opportunity to detect bombs and explosives before they enter the controlled perimeter. To make them effective planners must clearly delineate the installation perimeter. This includes fencing, concertina wire, barricades, counter-mobility barriers, ditches, police tape, or warning signs. The following table and figure highlight and illustrate the minimum antiterrorism standards for expeditionary and temporary structures in Annex D of UFC 4-010-01.

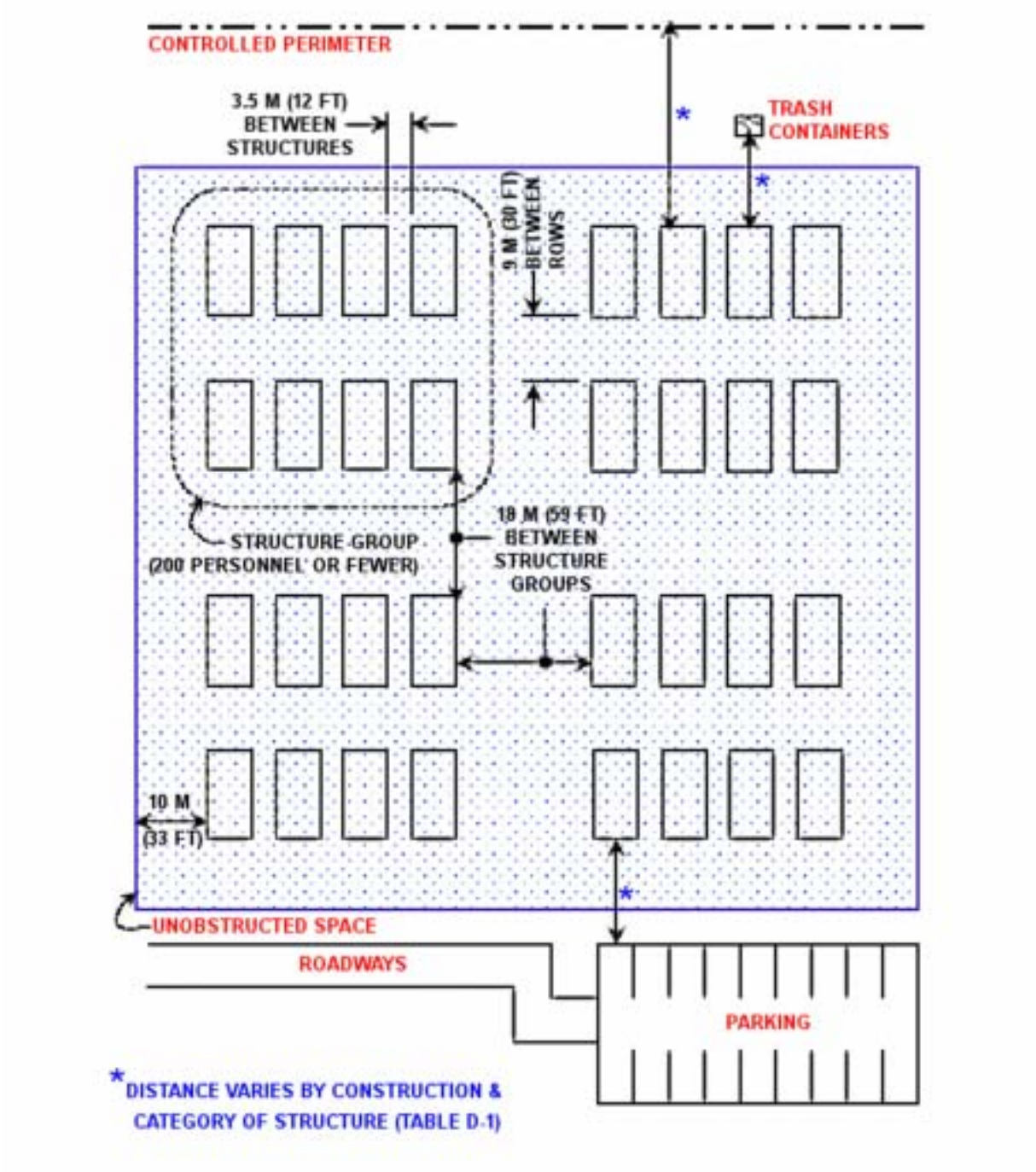
Table 5.3. Minimum Standoff Distances & Separation for Exped. & Temp. Structures.

Location	Structure Category	Standoff Distance or Separation Requirements			
		Applicable level of Protection	Fabric Covered/ Metal frame Structures (1)	Other Exped. & Temporary Structures (1)(2)	Applicable Explosive Weight (TNT) (3)
Controlled perimeter or parking roadways without a controlled perimeter	Billeting	Low	31 m (102 ft)	71m (233 ft)	I
	Primary Gathering Structure	Low	31 m (102 ft)	71m (233 ft)	I
	Inhabited Structure	Very Low	24 m (79 ft)	47 m (154 ft)	II
Parking and roadways within a controlled perimeter	Billeting	Low	14 m (46 ft)	32 m (105 ft)	II
	Primary Gathering Structure	Low	14 m (46 ft)	32 m (105 ft)	II
	Inhabited Structure	Very Low	10 m (33 ft)	23 m (105 ft)	II
Trash Containers	Billeting	Low	14 m (46 ft)	32 m (105 ft)	II
	Primary Gathering Structure	Low	14 m (46 ft)	32 m (105 ft)	II
	Inhabited Structure	Very Low	10 m (33 ft)	23 m (75 ft)	II
Structure Separation (4)	Separation between Structure Groups	Low	18 m (59 ft)	18 m (59 ft)	III(5)
	Separation between Structure Rows	Low	9 m (30 ft)	9 m (30 ft)	III(5)
	Separation between Structures in a Row	Very Low	3.5 m (12 ft)	3.5 m (12 ft)	III(5)

NOTES:

1. See UFC 4-010-01 for a complete description of these structure types.
2. For container structures refer to UFC 4-010-02 Appendix B.
3. Refer to UFC 4-010-02, for the specific explosive weights (kp/pounds of TNT) associated with designations – I, II, III. UFC 4-010-02 is For Official Use Only (FOUO).
4. Applies to billeting and primary gathering structures only. No minimum separation distance for other inhabited structures.
5. Explosive for building separation is defined as an indirect fire (mortar) round at a standoff distance of half the separation distance.

Figure 5.6. Standoff Distances and Separation for Expeditionary and Temporary Facilities.



5.7. Threat Specific Standards. In addition to the minimum standards described above, the DoD Security Engineering Manual provides guidance for incorporating additional measures to mitigate specific threats. That guidance includes design strategies for mitigating the effects of specific aggressor tactics to defined levels of protection and the effect on building cost of applying those measures.

5.7.1. Power Generation and Distribution. Wood or chain link fence will be installed around all generator, transformer and consolidated generator station locations. Enclosing generators in wooden buildings is not authorized.

5.7.2. Perimeter. Fences, either chain link or concertina, are authorized around the camp perimeter. Berms and sniper screens are authorized to block vision. Perimeter lights are authorized. A gravel perimeter road is authorized inside the berm. Culverts underneath the perimeter fence will be caged to prevent persons from crawling through.

5.7.3. Gates. Covered inspection areas on the main gates are authorized as required by weather conditions. Gates will have lighted, heated, guard shacks. Tilt bar and swing gates are authorized. Locate clearing barrels inside the gates.

5.7.4. Clearing Barrels. Clearing barrels will be installed at all access control points and outside the entrances to arms and ammunition storage areas, medical and dinning facilities.

5.7.5. Walkways and decks. Pressure treated, rot-resistant lumber is the standard. If not available, or cost prohibitive, consider using composite decking material for constructing walkways and decks. Untreated wood can be used if primed and painted. Paint any wooden walkways with sand paint or other non-slip materials to reduce the chance of slipping, particularly in climates with snow and ice or extended rainy periods. Provide lighting wherever steps cannot be seen at night.

5.7.6. Buried utilities. The BCE will maintain a database of all buried utilities. No job will be closed out until new underground utilities have been properly documented. No work will commence on a project until a dig permit has been obtained. Digging permits should also be coordinated for communication line clearance. Buried utilities will have caution tape at least one foot above the utility lines. Buried electrical lines will have signs posted at every turn in the line and wherever else needed by the terrain.

5.7.7. Bunkers. Only bunker designs approved by the Corps of Engineers, Engineer Research and Development Center will be constructed. Sand bag bunkers will have the sand bags protected from solar radiation and the wooden core protected from rot. Design factor is 110% of camp population for bunkers and fighting positions. Normal planning factor is that 50% of the population will be on the perimeter, with 50 % in bunkers.

5.7.8. Guard Towers. Guard towers will be placed so every tower is visible to the immediate towers on the right and left so there is no dead space on the perimeter. Towers will have heat and light. Towers will be hardened against small arms and mortar fire.

5.7.9. Constructed fighting positions. Overhead cover design on fighting positions must be approved by the task force engineer. Fighting positions must be inspected regularly for deterioration. A digging permit must be coordinated before any construction begins.

5.7.10. Theaters and similar multipurpose facilities. These facilities will have a barrier to minimize a car bomb threat. Barrier can be a berm, HESCO bastions, Jersey barriers, or other method capable of stopping a car or truck. Air induction units and other vents will be screened or fenced to reduce terrorist threat of gas introduced into the duct systems.

5.7.11. Water Plant. Water plants, wells, storage tanks and bladders will be fenced.

5.8. Siren Warning System (Giant Voice). Force Protection planning should include the installation of a dual tone warning system that supports voice and tone to alert personnel to local hazards and incidents.

The system should be sited to provide clear audible coverage of main work sites and billeting cantonment areas.

5.9. Mines, Improvised Explosive Devices and Unexploded Ordnance. The strength and capabilities of the US military make it an unstoppable force in the face of conventional symmetrical warfare. To balance the battlefield, the enemy has resorted to asymmetrical warfare tactics of small guerilla units armed with unconventional weaponry. Worldwide attacks over the last decade highlight this: suicide bombers in market squares, roadside daisy chain explosives along the supply routes in Iraq, booby-trapped facilities in Afghanistan, and airliners used as bombs during the September 11th attacks against New York and Washington DC. The military planner and bare base beddown engineer must be constantly aware of the threat of passive and active unconventional weapons. During the six months after cessation of major military actions during OIF, more US military personnel were killed by unconventional weapons and guerilla insurgents than were lost during direct combat actions against the Iraqi Army.

5.9.1. A common threat at most expeditionary beddown and airfield sites is the presence of anti-personnel explosive devices dispersed through enemy forces, insurgent groups or expended coalition unexploded ordnance. This results in the common EOD mantra to deployed personnel to STAY ON THE CONRETE. EOD personnel are essential for the clearing, de-mining and safing of a potential beddown area. This is particularly critical during the *planning* and *open the base* module. If EOD has not cleared the area, it doesn't matter how much equipment you have on site, you cannot initiate beddown erection. Theater level CE planners must advocate at the planning meetings to ensure that EOD is present on the survey ADVON team and if required in the initial cadre of personnel arriving to the site. The new Airborne Engineer CONOPS incorporates this requirement into its SOP for airfield surveys. During OAF, coalition EOD personnel provided a myriad of safing and clearing operations. A matrix of available methodologies and their advantages and disadvantages is found in **Table 5.4.**. This is to serve only as a general information sheet for engineer planners. All planning efforts should include the theater or deploying EOD commander or planner. Air Force engineers must remember that EOD actions may be completed by other than Air Force personnel.

Table 5.4. Neutralization and Detection Methods for UXOs.

*Advantages and Disadvantages of Neutralization and Detection Methods		
Neutralization Method	**Advantages**	**Disadvantages**
MCAP Dozer	- Has a rapid clearance rate - Clears AP mines - Clears subsurface, but has not depth - Mechanically reliable - Clears rough terrain	- Leaves uncleared berms - Not C-120 transportable - Causes severe percussion if AT mine detonates - Makes ground susceptible to becoming a quagmire
Medium Flails Ardvark and Hydrema	- C-130 transportable - Offer depth control - Clear at a relatively rapid rate - Likely to withstand AT blasts	- Slower than the MCAP dozer - Cause a large dust cloud - Make ground susceptible to becoming a quagmire - Less effective in rough terrain
Miniflail	- Effective for mine extraction and MOUT areas - Highly transportable	- Allow minimal subsurface clearance - Has a slow clearance rate
Explosive	- Has a high probability of neutralization (if munition is seen) - Effective for point targets	- Not effective against buried munitions - Requires direct soldier exposure - Not effective for large areas
SMUD	- Requires no direct soldier exposure - Effective for point targets	- Requires special training - Requires special equipment - Requires pinpoint detection
Detection Method	**Advantages**	**Disadvantages**
Visual	- Easiest method - Can scan large areas	- Not effective for buried munitions - Only as good as the observer's visual acuity - Requires direct soldier exposure
Metal Detector	- Highly effective for high-metal mines and UXO	- Not effective with metal clutter or ferrous soil - Relatively slow - Requires direct soldier exposure
Mine Detection Dog	- Has a high success rate under ideal conditions	- Relatively slow - Affected by environmental conditions - Requires intensive training
*** NOTE:** The advantages and disadvantages shown above are based on the subjective opinion of the author and are intended to give the reader a comparative analysis of the various clearance methods used in Afghanistan. This is not intended to be a complete objective analysis.		

5.9.2. During OAF, Army Combat Engineering Battalions had to complete extensive explosive clearing operations prior to beddown delaying the es tablishment of stationary beddown operations. At many locations in Yugoslavia and the Balkans, the Army is still clearing portions of the airfields that they have been operating on for over 8 years. Smal l insurgent countries have seen a proliferation of counter-personnel mining operations in an attempt toquell civilian uprisings and keep dictatorial governments in power. In every area of the Middle East, Far East, African and Balkans theater of operations, military personnel will be faced with the task of identifying the counter-personnel mine threat, presence and remediation of the threat. Conservative estimates identify over one billion counter-personnel mines currently deployed throughout the world. Most in areas where location maps no longer exist.

5.9.3. The construction of an improvised explosive device (IED) is simple: modify military ordnance, initiator/fuse, some plastic explosives and an i ndividual to trigger the explosion. This simplicity makes it very difficult to eliminate the IED threat.

Figure 5.7. Explosive Potential and Evacuation Distances.

	Threat Description		Explosives Mass[1] (TNT equivalent)	Building Evacuation Distance[2]	Outdoor Evacuation Distance[3]
High Explosives (TNT Equivalent)		Pipe Bomb	5lbs 2.3 kg	70 ft 21 m	850 ft 259 m
		Suicide Belt	10 lbs 4.5 kg	90 ft 27 m	1,080 ft 330 m
		Suicide Vest	20 lbs 9 kg	110 ft 34m	1,360 ft 415 m
		Briefcase/Suitcase Bomb	50 lbs 23 kg	150 ft 46 m	1,850 ft 564 m
		Compact Sedan	500 lbs 22 kg	320 ft 98 m	1,500 ft 457 m
		Sedan	1,000 lbs 454 kg	400 ft 122 m	1,750 ft 534 m
		Passenger/Cargo Van	4,000 lbs 1,814	640 ft 195 m	2,750 ft 838 m
		Small Moving Van/ Delivery Truck	10,000 lbs 4,536 kg	860 ft 263 m	3,750 ft 1,143 m
		Moving Van/Water Truck	30,000 lbs 13,608 kg	1,240 ft 375 m	6,500 ft 1,983 m
		Semitrailer	60,000 lbs 27,216 kg	1,570 ft 475 m	7,000 ft 2,134 m
	Threat Description		**LPG Mass/Volume[1]**	**Fireball Diameter[4]**	**Safe Distance[5]**
Liquefied Petroleum Gas (LPG--Butane or Propane)		Small LPG Tank	20 lbs/5 gal 9kg/19 l	40 ft 12 m	160 ft 48 m
		Large LPG Tank	100 lbs/25 gal 45 kg/95 l	69 ft 21 m	276 ft 84 m
		Commercial/Residential LPG Tank	2,000 lbs/500 gl 907 kg/1,893 l	184 ft 56 m	736 ft 224 m
		Small LPG Truck	8,000 lbs/2,000 gal 3,630 kg/7,570 l	292 ft 89 m	1,168 ft 356 m
		Semitanker LPG	40,000 lbs/10,000 gal 18,144 kg/37,850 l	499 ft 152 m	1,996 ft 608 m

1 – Based on the maximum amount of material that could reasonably fit into a container or vehicle. Variations possible.

2 – Governed by the ability of an unreinforced building to withstand severe damage or collapse.

3 – Governed by greater of fragment throw distance or glass breakage/falling glass hazard distance. Distances can be reduced for personnel wearing ballistic protection. Note that pipe bomb, suicide belt/vest, and briefcase/suitcase bomb are assumed to have a fragmentation characteristic that requires greater standoff distances than equal amounts of explosives in a vehicle.

4 – Assuming efficient mixing of the flammable gas with ambient air.

5 – Determined by U.S. firefighting practices wherein safe distances are approximately 4 times the flame height. Note that an LPG tank filled with high explosives would require a significantly greater standoff distance than if it were filled with LPG.

Chapter 6

FACILITIES UPGRADE, SUSTAINMENT AND MAINTENANCE

6.1. Overview. This chapter discusses transitioning from short-term use temporary expeditionary facilities to semi-permanent and permanent facilities. It also discusses various funding and programming requirements for beddown construction.

6.2. Transition to Temporary Standard, Semi-Permanent and Permanent Facilities. Typically the basis for transition to temporary standard facilities has relied on the Joint Publication 4-04 requirement that temporary standard facilities will be adopted when the deployment is expected to last more than 6 months, then temporary standards will increase usage up to 24 months. The realities of overseas deployment and the support of theaters and areas of responsibility have required basing to exist for more than 24 months, but usually less than 5 years to be considered as a standard for transition to even more permanent facilities. When a base will become a main base for operations and logistics support in a theater, the likelihood is that diplomatic and military agreements will require semi-permanent and permanent facilities to be constructed. Sometimes this is with conveyance to the host nation as a grant for basing, while in other cases the facilities may be conveyed to the host nation with the stipulation that the facilities may be used again in case of contingencies. When this is the case, additional agreements may be required to establish pre-positioning sites for deployment resources. Depending on the reason for the conflict, the scope of the work and the length of use, construction may be through O&M or MILCON funding.

Figure 6.1. Prince Sultan Airbase – Enduring Presence Construction Standard.

6.3. Normal Transition to Temporary Facilities. Construction and quality of life upgrades should be programmed and planned as soon as resources and mission expectations allow. If initial beddown missions are planned for long term US presence than CE planners should initiate and advocate for semi-permanent construction standards as soon as resources allow. This will free up critical BEAR assets for utilization in short term expeditionary, FOB and FOL bases. During the maturation of the mission, bases may be identified for longer operational requirements therefore requiring the upgrade of the base construction standards.

6.4. Funding Transition and Beddown Construction. Engineering planners must be aware of funding and programming requirements for all levels of expeditionary and contingency beddown and construction. Attempts to circumvent these programming and funding requirements usually results in significant delays and paperwork in gaining the appropriate approvals. Although many of the authorities require up to 30 days of approval and processing, it is quicker than trying to go around the rules. Further details and decision flow charts for deciding which authorities are appropriate for your requirements can be found in JP 4-04, Appendix F, pages F-3 through F-5.

6.4.1. Operation and Maintenance (O&M) Funding: The Air Force is authorized to use annual O&M funds for construction projects less than $750K. This is a peacetime provision that is applicable during contingencies and emergencies. During combat or designated contingency operations, O&M may be used under certain circumstances to fund construction projects exceeding these thresholds. The theater or wing legal office must be consulted prior to expending O&M funding for contingency construction.

6.4.2. Title 10, USC, Emergency and Contingency Construction: Title 10 USC contains numerous broad authorities to fund contingency construction.

6.4.3. Section 2803 Emergency Military Construction Authority: Section 2803 authorizes AF leadership to use up to $30M per year of unobligated military construction (MILCON) for projects that cannot wait for the normal MILCON program submission and approval process. Section 2803 projects require a 21-day Congressional notification period for members to question the applicability of utilizing current year funds for the requested project. Planners need to be aware that 2803 funds are current year MILCON funds currently authorized for another project. If you utilize 2803 funds for a project, the AF loses a similar project elsewhere to fund the requirement.

6.4.4. Section 2804 Contingency Construction Authority: Section 2804 funding authority allows the Secretary of Defense to designate a specific military construction program line item amount for contingency construction projects that cannot wait for normal MILCON submission and authorization. Section 2804 funding normally is less than $10M per year and requires a 21-day Congressional notification period.

6.4.5. Section 2805 Unspecified Minor Construction: Section 2805 authorizes the AF (and other services) a military construction program line item for unspecified minor construction requirements. Project funded under this authority cannot exceed $1.5M. Projects exceeding $500K require a 21-Congressional Notification period.

6.4.5.1. CE construction planners should coordinate with USAF/ILEC to request utilization of these funds.

6.4.5.2. Exercise related construction (ERC) projects complement and enhance the Chairman Joint Chief of Staff (CJCS) Joint Training Plan Exercise Program. Projects will be developed to enhance the effectiveness of exercise activities, reduce overall exercise costs, enhance safety and

improve training of engineer forces. ERC may be accomplished by US troops, combined US-host nation engineer forces, or by contractor (accomplishment by contractor is the least preferred option). Where an ERC project is planned in a country eligible for assistance, an HCA construction project should be planned in conjunction with the ERC project.

6.4.5.2.1. ERC is defined as an unspecified minor construction project, outside CONUS, in support of an in-progress or planned CJCS exercise that results in a facility, or facilities that remain, in any part after the end of the exercise.

6.4.5.2.2. The cost of a single ERC project may not exceed $1,500,000. Each ERC project must be approved by the Joint Staff and reported to Congress. No construction funds may be obligated until the appropriate Congressional committees have approved the project or a 21-day waiting period has elapsed from the date of the notification. An ERC project includes all construction necessary to produce a complete and usable facility. Construction costs can vary +/- 25% without the requirement to request Joint Staff approval.

6.4.6. Section 2808 Construction Authority in the Event of a Declaration of War or National Emergency: Section 2808 authority can only be granted after a Presidential declaration of war or national emergency. Section 2808 allows the Secretary of Defense to carry out any military construction project for the war or national emergency within the total unobligated military construction program. Congress must be notified of all 2808 projects but does not require a 21-day delay of authorization of funding.

6.4.6.1. Section 2808 authority was executed during OEF and OIF. Difficulties gaining access to authorization of 2808 funds, legal reviews and differing views of the extent of the authorities caused delays in executing critical contingency construction projects.

6.4.6.2. Similar to Section 2803 funding, funds are taken from current year authorized construction projects. Normally, overseas projects are sacrificed to eliminate the cancellation of CONUS based projects.

6.5. Other Authorities and Sources of Funding.

6.5.1. Burden sharing (Title 10, USC Section 2350j). This statute provides authority enabling the DOD to accept funds from host nation or foreign governments for burden sharing of construction, supplies and services. Section 2350j funding is complicated by the inclusion of foreign nation investment and partnering. Additional information of 2350j can be found in JP 4-04 page F-2. Engineering planners must involve their legal office in the consideration of utilizing this authority.

6.5.2. Economy in Government Act (Title 31, USC, Section 1535). This statute allows for US Government agencies, outside of the DOD, to fund AF execution of contingency construction projects providing they have the funds and authority to do so. Your legal office is critical in making the determination of request for utilization of this authority.

6.5.3. Humanitarian and Civic Assistance (HCA) (Title 10, USC, Section 401). Joint force engineers may work with host nation government agencies to repair or improve infrastructure and public facilities. These authorized and funded projects must fulfill unit training requirements that incidentally create humanitarian benefit to the local populace. HCAs are usually planned well in advance and are usually not in response to disasters, although some have been executed following disasters. Specific engineer activities for which HCA funds can be used include construction of rudimentary surface

transportation systems, well drilling, construction of basic sanitation facilities and rudimentary construction and repair of facilities.

6.5.4. Foreign Humanitarian Assistance (FHA). In disaster operations, the UN and the Department of State's Office of Foreign Disaster Assistance (U SAID) may generate funded requirements for DOD assistance. FHA programs focus on the use of DO D excess property, emergency transportation support, disaster relief, or other support as necessary to alleviate urgent needs in a host country caused by some type of natural or manmade disaster that might present serious threat to life or great damage to or loss of property. While other elements of the joint force are focused on immediate FHA, civil engineering support planning may focus on projects that provide expedient shelter for dislocated civilians. The joint force engineer and staff should work closely with the representatives of the host nation and US Country Team.

Chapter 7

REDEPLOYMENT AND RECONSTITUTION

7.1. Overview. Expeditionary Airbases will transition as the mission and operational requirements change. Base transition can be either improvement of construction standards as outlined in **Chapter 6** or return of the base back to host na tion ownerships when the US forces depart from the site. This chapter will focus on base closure and return of the site back to host nation and/or civilian ownership or management.

7.2. Transition. Since eventually an expeditionary airbase will transition back to civilian or host nation control, deployed units should understand the theater level redeployment and reconstitution plan to better carry out the operational requirem ents for their units. Redeploymen t operations are dependent upon the combatant commander's defined mission end state, peacekeeping requirements and host nation support requirements. Reconstitution is defined as the proc ess of returning deployed fo rces to full operational readiness, to include personnel actions, training a nd equipment repair and replacement. Redeployment normally occurs once the combatant commander has de creed that the deployed location will transition from combat operations to civilian reconstruction or peacekeeping operations.

Figure 7.1. Recovery of BEAR Assets.

7.2.1. Transition operations cover a wide range of requirements that must be met prior to the last US personnel or US contractor leaving the site. The gener al rule of thumb to go by is Leave the land and infrastructure better than you found it.

7.2.2. Base engineers have seen the fallout of leavi ng a base in less than pristine condition when we redeploy troops to an old s ite and run into the host nation engineer that was left with the clean-up headache. Engineers will be responsible for the vastmajority of clean-up requirements and in turn will probably be some of the last troops to leave the site.

7.3. Redeployment. Redeployment applies to onward or forward deployment as well as return to home station. Redeployment planning is essential to an effective and efficient return of deployed resources or forward deployment of combat capability. Redeployment activities need to begin long before a redeployment order is received. Normally, the planning process begins upon arrival at the deployed location. This ensures all deployed resources are accounted for and redeployment movement activities comply with host nation customs requirements. Redeployment is not deployment in reverse. First, fragmented UTCs or unit line numbers (ULN) are more likely to be incrementally redeployed/forward deployed to retain residual capability at the original deployed location requiring the supportability of remaining forces. Planners need to plan for the movement of parts of units, UTCs, or ULNs. Secondly, it is common to receive redeployment orders calling for the redeployment of fragmented UTCs and ULNs rather than a reverse TPFDD. Additionally, due to military, political or diplomatic reasons, redeployment may be far more rapid than the deployment phase, which makes early-on redeployment planning all the more critical.

7.3.1. During planning commanders must understand that redeployment can be a significant engineering challenge, particularly when terminating overseas contingency operation. Civil engineer operations support force redeployment through the preparation of facilities for retrograde, completion of construction projects and the refurbishment and turnover of property and real estate to the host nation.

7.3.2. Additionally, engineers terminate leases and facility contracts, construct wash racks and other redeployment facilities, prepare collection points and coordinate for the safe disposition of hazardous cargo. Commanders and civil engineers must be aware of legal consideration involved in these redeployment activities.

7.4. General Considerations for Redeployment and Reconstitution. The situation, condition of assets and the need for redeployment/reuse will dictate the extent and methods used for recovery and reconstitution. During deployments, CE teams can anticipate increased loss of equipment, tools and other resources due to increased utilization and harsh climatic conditions. Your teams should strive to replace worn-out or destroyed assets as they are lost (prior to redeployment) as in-theater equipment funding is much stronger than at home equipment accounts.

7.4.1. CE leadership needs to ensure that funds expended are used to replace assets required and not just desired as nice to haves. There have been numerous instances of deployed teams purchasing the next greatest technology only to find out that it does not meet their need.

7.4.2. Teams also need to realize that assets purchased in theater to support operational requirements, that are not listed on you teams equipment supply list (ESL) or Vehicle authorization list (VAL), will need to be transferred to the incoming team for their use. This often occurs when units validate the purchase of bobcats and gator transports in theater and hope to take them back for use at home station. This is not practical because if you needed them in the ater so does your replacement. Secondly, at close to $5,000 per hour for operation of airlift, it is cheaper to buy a new bobcat when you get home.

7.5. Reconstitution of BEAR Assets. Once erected, BEAR assets are operated and maintained primarily by Prime BEEF and Services personnel. Depending on the situation and the asset, selected 49 MMG personnel, AFCESA's CE Maintenance, Inspection and Repair Team (CEMIRT), or a trained theater support contractor may also assist. The senior on-scene commander, who is normally the AEF/AEW commander, must appoint a Bare Base Manager (BBM) at each location that is using BEAR. The BBM has custodial responsibility for the BEAR assets until turned in for redeployment. Redeployment planning is a theater responsibility. Assistance in striking assets is normally requested as needed from the 49 MMG through

Air Combat Command's Logistics Plans office. Reconstitution occurs after the deployment mission requirement has ended through either force redeployment or transition to temporary or permanent standard facilities and utilities. Reconstitution usually involves extended operations to clean, inventory; perform intermediate- or depot-level maintenance and repair and repackage assets for shipment or storage. This effort is normally handled by the asset owner, usually 49 MMG or a theater operating location, or on a limited basis it may include CEMIRT and AFCAP/LOGCAP/CONCAP or theater contractors prior to shipment for storage.

7.6. Recovery. Unless there has been an attack with damage to the bare base, generally the term recovery means the dissembling and repacking of BEAR systems for redeployment shipment to another location or the demobilization and readying of the base for return to the national owners. For facilities such as personnel shelters, medical facilities, dining halls and smaller flightline shops, the user, Prime BEEF and logistics personnel generally accomplish this. For larger shelters/hangars this may have to be accomplished by RED HORSE, 49 MMG teams or trained teams from AFCAP/LOGCAP/CONCAP. Theater planners should consider whether mobile support teams should be established to conduct recovery operations and conduct user-level maintenance/repair prior to repacking. It may be readily apparent for some assets that they can be reused without reconstitution. All parties participating in recovery need to make sure that the designated BBM is properly informed and knows the condition of all assets before making the decision to redeploy them forward or reutilize in the field. If they are not in a condition to allow for immediate erection and use for at least another six months, then the items must be identified as requiring maintenance or identified that additional personnel and supplies may be required for erection and reuse. This is especially important when the assets are vehicles and equipment items such as generators, high voltage electrical distribution components, ROWPUs, pumps, bladders, etc., for utility system support.

7.7. Civil Engineering Support of Transition Operations. The deployed engineering squadron is one of the last teams to leave the contingency airbase. The engineers normally have the main responsibility for preparing the base for transition to a civilian led task force, military peacekeeping operation, base closure or return of infrastructure to the host nation. Civil engineer squadrons should be prepared to support the following transition requirements in addition to normal reconstitution and squadron redeployment priorities:

7.7.1. Termination of base support contracts (refuse, Class IV materials, cleaning etc.).

7.7.2. Preparation of documentation for turnover of facilities and real estate.

7.7.3. Reconstitution of advance bases, staging areas and recovery/inventory and repacking of war reserve material.

7.7.4. Definition and award of contingency support contracting (AFCAP, CONCAP, or LOGCAP) as outlined in **Chapter 8** of this volume.

7.7.5. Cleanup (in-house or civilian contract) of contaminated sites and waste disposal areas.

7.7.6. Repair of civil infrastructure damaged by US military operations and utilization.

7.7.7. Construction of facilities required for preparing assets for redeployment (marshalling yards, customs yards, wash racks etc.).

7.7.8. Minefield marking and clearance.

7.7.9. Port surveys and coordination of port clearance requirements for movement of equip-ment and assets.

7.7.10. Development and production of topographic, geographic and base utility tabs for future operations.

7.7.11. Construction of foreign humanitarian assistance and humanitarian civic assistance projects as defined and negotiated by CREST or the theater engineer and combatant commander.

7.8. Redeployment Scheduling, Validation and Transport. Redeployment is scheduled and prioritized by the combatant commander's mission requirements and planning staff. It is imperative that the Combatant Commander maintains the right balance of forces until he no longer requires them for mission accomplishment. In an effort to streamline this process, base level units need to have a redeployment plan in place to be able to adequately schedule and meet redeployment timelines. To support this, the CE planner needs to understand the process of prioritizing, validating and scheduling transport, regardless of the mode of travel.

7.9. Redeployment Requirements Validation. Once a unit has been prioritized for redeployment, the unit is responsible for confirming readiness posture, movement availability dates and passenger and cargo details (load lists, weights etc.) to their higher commands, who will verify and prioritize movement scheduling.

7.9.1. The supported component commander receives the base reports and merges this into the redeployment TPFDD, and adjusts prioritizations as required.

7.9.2. Once the prioritizations are finalized, the planning cell validates the lift requirements within the specified TPFDD window of movement for USTRANSCOM movement scheduling.

7.9.3. USTRANSCOM conducts a transportation feasibility review and coordinates unresolved transportation conflicts with the supported commander. Once completed, US-TRANSCOM forwards requirement back to the supported commander as an approved TPFDD that redeploying units use for scheduling.

7.9.4. Once scheduled the unit will be directed to proceed, IAW flow schedule, to a port of debarkation for airlift back to home station or on to another mission requirement.

7.9.5. Lessons Learned on redeployment. If a redeploying unit misrepresents its requirements (weights, passengers, availability, etc.) during the planning phase of this process or fails to adequately prepare for redeployment, their airlift or transport will be affected and possibly delayed.

7.9.5.1. During OIF and OEF a number of redeploying CE units were frustrated at the inability of USTRANSCOM and TACC to schedule required airlift on the approved rotation dates. During investigation of the problem, it was discovered that the returning units had requested dated changes on a number of occasions, had changed passenger lists and cargo load requirements necessitating changes to airframes. The best way to ensure that your team gets home as scheduled is to have a well thought out redeployment plan at the start of the deployment. This should include passenger manifests (adjusts as the unit gains or loses personnel through combat attrition, injury or reorganization), anticipated load plans (what did you bring versus what are you brining home) and rotational requirements (know which passengers and equipment need to go where).

7.9.5.2. The USTRANSCOM and TACC scheduling and validation process normally takes a minimum of 10 days during normal operational requirements. During contingency operations and high periods of airlift demand this process can take up to 21 days with continual modifications and changing mission requirements. As the CE planner or commander, you must keep visibility on the TPFDD, airflow scheduling validation and potential problems. The only guarantee of a flight home is the day that the TACC scheduler or logistics planner provides a tail number of the aircraft you are flying home on. During redeployment, your logistics planner is your best friend; constant coordination and partnering will get your team home.

7.10. Environmental Requirements. The Air Force is committed to maintaining a high level of environmental quality during contingency operations. Civil engineers have a special role in helping to meet this commitment and in full compliance with environmental standards. While the degree of compliance with these standards is affected by the location and activities performed, and may vary during different phases of contingencies, the goal is to restore a site to predeployment condition and return it to the host nation or appropriate agency. Areas of consideration include:

7.10.1. Hazardous waste storage/disposal, using the DRMO as a disposal agent, hazardous material labeling/packaging, mark/map abandoned wastewater facilities, preventing hazardous spills and minimizing air/noise pollution.

7.10.2. For detailed information on these and other environmental requirements during redeployment and reconstitution, see AFH 10-222, Volume 4.

7.11. Conclusion. The end of hostilities, operations or disaster recovery does not mean the end of the Expeditionary Engineer responsibility. The CE Commander and personnel need to plan to be one of the last support functions to leave the deployed locations as they will be responsible for recovering the site to better than its original condition, transfer of ownership of agreed facilities and environmental clean-up and remediation. During OAF, OEF and OIF it was common for the operations and logistics groups at deployed locations to depart, leaving the Mission Support Group (MSG) Commander or the senior MSG squadron commander in charge of closing and recovering the base prior to redeployment. CE planners need to start creating a redeployment plan during the initial deployment to ensure they have adequate resources identified.

Chapter 8

CONTRACT AUGMENTATION PROGRAMS

8.1. Overview. The military is one-third smaller today than a decade ago yet averages almost twice the number of deployments and contingency operations. This operational tempo versus resources highlights a need to augment operational capability throughout the Department of Defense. In the early 1990s, the DOD created contract augmentation programs or CAP (LOGCAP, CONCAP, and AFCAP). These programs enabled the military to augment its current capabilities through the contract award of stand-by rapid response force contracted civilian capabilities. It is not cheap to contract the stand-by rapid response, professional expeditionary combat support and construction services of civilian contractors, but during contingency operations it frees up military personnel to complete military missions while civilian contractors take care of non-military specific requirements.

8.2. Air Force Guidance on Contractors in Theater of Operations. Civilian contractor personnel accompanying Air Force forces are not combatants and must not be allowed to act as combatants during Air Force operations. Civilian contractor personnel have historically provided support to fielded military forces and international law allows for such activities. Therefore, it is Air Force policy to integrate increased commercial support to the total force wherever appropriate while preserving our core competencies.

8.2.1. The risks must be minimized when deciding to use contractors to provide essential services. In fact, a uniformed capability should be maintained to provide essential services in the event the operational environment precludes the use of contractors. AFMAN 10-401, Volume 2, *Planning Formats and Guidance,* requires that full consideration of the impact of contractors must be addressed in developing operational plans. Commanders should limit the designation of essential contract services (IAW DODI 3020.37, *Continuation of Essential DOD Contractor Services During Crisis)* to those truly indispensable to the accomplishment of the unit's operational mission. Contracts will identify which services are essential. If the contract has essential services, contractor support requirements must be integrated fully into the total force structure and planning to ensure mission accomplishment. Any determination regarding commercial support must consider the essential services that must be maintained and the risks associated due to possible contractor non-performance. Again, if contractors can't be used to do the job, military personnel must be integrated into the planning process.

8.2.2. Contractors are expected to comply with all applicable US and international law. Unless addressed otherwise by international agreement, contractor personnel are subject to the law of the nation in which they are located. This means that contractors must be prepared to comply with all local taxes, immigration requirements, customs formalities and duties, environmental rules, bond or insurance requirements, work permits and transportation or safety codes. The fact that the military force for which they are performing services enjoys certain exemptions from local law does not mean contractor personnel are also exempt--generally, contractor personnel are not exempt from local law. During a declared war, contractor personnel accompanying the armed forces are subject to the criminal jurisdiction of the military and the Uniform Code of Military Justice. However, in all circumstances contractors are subject to host nation criminal law, unless specifically addressed otherwise by international agreement. Contractor employees and other civilians accompanying the armed forces may also be prosecuted by the United States for criminal acts.

8.2.3. When contractor personnel are deployed in support of Air Force operations, the Air Force may provide or make available, under terms and conditions as specified in the contract, force protection and support services commensurate with those provided to DOD civilian personnel to the extent authorized by US and host nation law. These services may include but are not limited to medical/dental care, messing, quarters, special clothing, equipment, training, mail and emergency notification. Air Force units are to provide only those goods and services to contractor personnel that are specified in the terms of the contract when authorized under host nation law or applicable international agreement. If the Government provides support services to contractor personnel, it may increase the overall cost to the Government. Planning to provide this support to contractors must include a careful review of host nation law and applicable international agreements as well as contract pricing, budget and military manpower (reference AFMAN 10-401, Volume 2). Commanders and the requiring activity will determine which services are essential and submit requirements, including proposed support services, to the contracting officer to modify existing contracts. All future contracts will need a determination if essential services exist and, if necessary, incorporate requirements in the statement of work (SOW). SOW language should also include applicable deployment requirements, both medical and physical, and allow for contractor information system interoperability with USAF and/or government information systems.

8.2.4. During contingencies that do not constitute international armed conflicts, the status of contractor personnel accompanying the armed forces is entirely determined by host nation law or applicable status of forces agreements, although contractors are seldom included in such agreements. During contingencies that constitute international armed conflicts, contractor personnel are non-combatant persons accompanying the armed forces but may be subject to hostile action because of the support they provide in close proximity to combat forces. Commanders should take care to ensure contractor personnel are not used in any manner that would jeopardize their status under international law as non-combatant persons accompanying the armed forces. Assuming they have not jeopardized their status as noncombatants, if captured during an international armed conflict, contractor personnel accompanying the armed forces are afforded the same protection granted to Prisoners of War (POWs) under the Third Geneva Convention of 1949.

8.2.5. Air Force commanders should not issue firearms to contractor personnel operating on their installations, nor should they allow contractor personnel to carry personally owned weapons. With the express permission of the geographic combatant commander and in consultation with host nation authorities, Air Force commanders may deviate from this prohibition of firearms only in the most unusual circumstances (e.g., for protection from bandits or dangerous animals if no military personnel are present to provide protection).

8.2.6. Air Force commanders should not issue military garments (e.g., battle dress uniforms or Gore-Tex jackets) to contractor personnel. Exceptions may be made for compelling reasons such as a need for chemical protective equipment when the contract requires the Government to issue such items rather than requiring the contractor to provide them to its personnel. Should commanders issue any type of standard uniform item to contractor personnel, care must be taken to require that the contractor personnel be distinguishable from military personnel with some distinctively colored patches, armbands, or headgear.

8.2.7. Although many contractor personnel supporting Air Force operations are former military members, the contract and commanders must make it clear that contractor personnel have no military status.

8.3. Air Force Contract Augmentation Program. Air Force policy is to integrate increased commercial support into the total force wherever appropriate while preserving its core uniformed competencies (for complete Air Force policy governing contractors in the theater, see Appendix E). In support of this, the AF has developed the AFCAP concept. The AFCAP contract provides the following support.

8.3.1. Commander Support. AFCAP provides commanders a responsive, force multiplier option to augment or relieve expeditionary combat support functions participating in military operations other than war (MOOTW) or small-scale contingencies (SSCs).

8.3.2. Quick Response, Contract Deployment Capability. AFCAP is a contract with extensive worldwide support capabilities, able to respond in minimal time. Capabilities focus on temporary contingency skills and/or resources to sustain military forces participating in MOOTW/SSCs or to recover from a natural disaster, accident, or terrorist attack.

8.3.3. Planning and Deployment. The contractor shall provide the personnel, equipment, materials, services, travel and all other means necessary to provide a quick response, worldwide planning and deployment capability. Planning is expected to be available within the contractor's program management team and other company resources. Deployment capabilities are to be obtained as required for a site-specific scenario. The capabilities under this contract are intended to support Air Force MOOTW/SSC activities operating in support of National Command Authority missions, which could include (but are not limited to) joint or combined United States military forces acting as part of or in concert with United Nations (UN), North Atlantic Treaty Organization (NATO), multinational force, or other entities. MOOTW/SSCs may include Air Force required support to natural disaster relief operations within and outside CONUS.

8.3.4. Deployment Capabilities. The principal effort of this contract will be to provide deployment capabilities generally aligned with Air Force combat support and combat service support functions associated with expeditionary combat support, to include the Civil Engineer and Services career fields and to provide logistic support that reduces a dependence on scarce war reserve materiel stockpiles. A partial list of skills typically required include: carpentry, plumbing, electrical, mechanical (e.g., refrigeration, air conditioning, heat, controls, etc.), heavy equipment, paint, power production, food service, lodging management, recreational services, housekeeping services, laundry plant operation, various utility plant operations (e.g., water, sewage, solid waste disposal, etc.), structural fire protection and fire crash rescue, unexploded ordnance (UXO) technician (e.g., clearing sub-scale practice bombs), emergency management, professional engineering, and project and program management.

8.3.5. Program Management Office. The contractor shall provide the necessary supplies, equipment and personnel to sustain administrative/management support for the Air Force Contract Augmentation Program (AFCAP). Minimum requirements include: having a dedicated program management office within a 25-mile radius of Tyndall AFB, FL, with the capability to develop Rough Order of Magnitude (ROM) cost estimates and execute individual task orders. This program management office shall be available for support 24 hours a day, 365 days a year.

8.3.6. Types of Response. Because military forces are trained and equipped for rapid deployment and flexible support for a variety of scenarios, the expectation is that initial response to a MOOTW/SSC will generally be assigned to military forces. As these forces establish a base(s) of operations and extended activities are likely to occur, AFCAP relief, augmentation, or expansion are potential resource options. However, the above statement does not rule out the possibility that AFCAP contract support may be the initial responder in selected scenarios, particularly small scale, fast moving, iso-

lated location scenarios or during worldwide recovery operations. In addition, work may include MOOTW/SSC backfill support at existing operational Air Force bases within and outside the United States to augment sustaining forces.

8.3.7. Background. AFCAP represents an initiative to contract for base operating support and temporary construction capabilities to relieve or augment military support forces and resources involved in MOOTW/SSCs. MOOTW are described as military actions, except those associated with sustained, large-scale combat operations and SSC is a new term for military operations other than war. These military actions can be applied to complement any combination of the other instruments of national power and occur before and after war [Joint Publication 3-07]. Generally, these operations will occur in a noncombatant, forward deployed environment (outside United States territory). However, this does not eliminate the possibility of natural disaster support or home base backfill sustainment support in the United States.

8.3.8. Typical Air Force Deployment Locations. With rare exceptions, Air Force deployments are tied to airfields which typically contain at least some existing buildings and utility infrastructure. Therefore, deployment support will usually include a variety of operation and maintenance (O&M) requirements to fixed, existing real property, as well as providing measures to augment or emplace additional temporary services and facilities.

8.3.9. Customers. Through the AFCAP Program Management Office, this contract is established to support Air Force major commands (MAJCOM) and associated component commanders.

8.3.10. Deployment Capabilities. All expeditionary combat support functions to include but not limited to the following tasks.

8.3.10.1. Deployed Management/Services Management Cell. Contractor shall establish an on-site central management cell for (at a minimum).

8.3.10.1.1. Contractor management responsibilities, including scheduling, management plan updating, supervision, cost control, etc., necessary to assure task order success.

8.3.10.1.2. Contractor and customer work order /job order receipt, processing and control; logistics/procurement management; contractor command, control and communications and liaison with the on-site customer.

8.3.10.2. Security. The contractor shall develop and implement OPSEC/COMSEC procedures; develop and implement internal contractor controls to provide physical security protection of property from theft.

8.3.10.3. Professional Engineering. The contractor shall provide home office and/or on-site professional architect-engineer services (including foreign sources) appropriate to the task order scenario.

8.3.11. Airfield Support. The contractor shall provide operation, maintenance, repair, installation and renovation of airfield requirements.

8.3.11.1. Airfield unique facilities such as control tower(s), hangars, hardened aircraft shelters, NAVAID shelters, etc.

8.3.11.2. Airfield surfaces (including underlying structures) such as runways, taxiways, aircraft parking ramps, hot cargo pads, grounding points, tie downs, sweeping, foreign object removal,

snow and ice control; implement bird aircraft strike hazard (BASH) recommendations, vegetation control, soil stabilization, clear zone maintenance (e.g., tree removal), etc.

8.3.11.3. Aircraft arresting systems including operation (setup & resets), operator level maintenance, and repair (installation/removal done by others).

8.3.11.4. Lighting including commercially installed high/low voltage, Emergency Airfield Lighting Set (EALS), strobes, Pulsed Light Approach Slope Indicator (PLASI), Visual Approach Slope Indicator (VASI), Precision Approach Path Indicator (PAPI) systems, ball park ramp lighting systems, foreign systems, etc.

8.3.11.5. Markings/Striping--e.g., runway centerline/edges, taxiway centerlines, hold lines, magnetic compass runway orientation numbering, distance/barrier markers, touchdown zone stripes, aircraft parking layouts, etc.

8.3.11.6. Emergency power--e.g., dedicated emergency power for selected critical facilities/infrastructure (e.g., control tower, lighting, etc.).

8.3.12. Infrastructure Support. Provide operation, maintenance, repair, installation and renovation of infrastructure requirements. Contract focus will be on providing temporary methods and materials to solve tasked requirements (e.g., tents, expandable/portable buildings and modular systems).

8.3.12.1. Facility Support. Air Force basing typically includes some existing infrastructure so construction craft personnel skilled in disciplines such as structural, electrical, plumbing, mechanical, fire and security alarms, etc., shall be provided by the contractor as appropriate to the task order scenario.

8.3.13. Utilities.

8.3.13.1. Electrical distribution systems, such as high/low voltage, AC/DC, switching, underground, pole mounted, surface laid, transformers, and converters.

8.3.13.2. Power production, such as receive and distribute commercial power; install and operate prime generator plant for task order infrastructure and standby generators.

8.3.13.3. Water distribution & storage system, including storage (elevated tanks, bladders, etc), pumps, piping (underground, surface laid, etc), valving and metering.

8.3.13.4. Water production and treatment, such as tap commercial sources, drill wells, operate existing water treatment plants, establish expedient water treatment plant, chlorinate and fluoridate.

8.3.13.5. Sewage distribution system—e.g. underground, surface laid, valving, lift stations and clean outs.

8.3.13.6. Sewage treatment plant—tie into commercial system, operate existing plant, develop expedient treatment (e.g., leach field, lagoon).

8.3.13.7. Steam plant (heat)—operate, maintain and repair.

8.3.13.8. Fire protection systems—existing installed systems (e.g., sprinkler, deluge, halon and standpipe).

8.3.13.9. Support expedient installation of fire protection systems and/or add to existing systems.

8.3.13.10. Natural gas distribution—existing natural gas distribution systems.

8.3.13.11. Compressed air system—existing compressed air systems.

8.3.13.12. Propane and/or fuel oil storage & distribution systems (heat)—propane and fuel oil systems.

8.3.13.13. Alarm systems—fire and security alarm distribution systems and associated central monitoring stations.

8.3.13.14. Energy monitoring and control systems (EMCS)—existing system.

8.3.13.15. Storm drainage system.

8.3.13.16. Petroleum, oils, lubricants (POL).

8.3.13.17. Aircraft storage tanks (above- and underground) and bladders.

8.3.13.18. Aircraft POL distribution system, including hydrant system, manifolds, lines (above- and underground), pumps and valves.

8.3.13.19. Non-aircraft POL storage—tanks (above- and underground) and bladders.

8.3.13.20. Non-aircraft POL distribution system—dispensers, lines (above- and underground), pumps and valves.

8.3.13.21. Solid waste management—establish pickup points and appropriate containers, pickup and transport to landfill or commercial solid waste pickup point.

8.3.13.22. Landfill—establish, operate, maintain, repair and close.

8.3.13.23. Recycle—establish and operate a recycling program as appropriate and required by a specific task order (e.g., paper, plastic, glass, metals, chemicals, etc.).

8.3.13.24. Incineration.

8.3.13.25. Roads/Parking.

8.3.13.26. Paving—all surfaces (asphalt, concrete, etc.), including subsurface structures and striping.

8.3.13.27. Unimproved (dirt)—stabilization, grading, mud and dust control.

8.3.13.28. Security structures—structures such as chain link fencing, barbed wire fencing, razor tape, observation towers, defensive fighting positions and electrically or hydraulically operated entry barriers.

8.3.14. Environmental.

8.3.14.1. Permits—support for preparation/submittal.

8.3.14.2. Hazardous material—support for management, inventory/control, ultimate disposition.

8.3.14.3. Hazardous Waste. Perform required management, collection, storage and disposal in accordance with applicable laws/regulations.

8.3.14.4. Pest/Vegetation Control. Assess needs and apply appropriate agents.

8.3.14.5. Environmental Clean-up. Provide capability to clean up and contain localized environmental spills resulting from MOOTW/SSC activities.

8.3.15. Emergency Support Services.

8.3.15.1. Fire protection. Provide full range of fire protection to include fire prevention and hazardous materials response/mitigation support. All fire fighters, to include supervisory levels (e.g., fire chief, crew chief, station chief, assistant chief, etc.) must be certified or have equivalent experience to meet the requirements outlined in the appropriate National Fire Protection Association professional qualifications standards.

8.3.15.2. Prevention. Develop fire prevention programs and promote fire prevention awareness. Personnel must be certified Fire Inspector I or II, or have equivalent experience to meet the requirements outlined in the National Fire Protection Association Professional Qualification Standard 1031, *Professional Qualifications for Fire Inspector.*

8.3.15.3. HAZMAT. Provide appropriate HAZMAT response capability. Personnel must be trained and employer certified per Code of Federal Regulations 29 CFR 1910.120 (Q) at the Awareness, Operations, Incident Command and/or Technician level as appropriate for the specific task order scenario.

8.3.15.4. Planning. Develop, coordinate and publish site-specific emergency management plans. Plans must address actions to prepare for, survive during, respond to and recover from local natural, man-made or technological disasters.

8.3.15.5. Warning systems. Identify requirements, install, operate and maintain an integrated emergency warning system. The system must provide standard Air Force notification for personnel at risk and recall of disaster response and control personnel.

8.4. Ancillary Capabilities. Provide maintenance, repair, installation and renovation of a variety of ancillary requirements, such as:

8.4.1. Facility Hardening. Task includes berming, sandbagging, plywood reinforcing, shoring, etc.

8.4.2. Dispersal. Where dispersal is required, establish multiple storage, parking and maintenance sites.

8.4.3. Obstacles. Includes entry obstacles, delaying obstacles, etc.

8.4.4. Redundancy Measures. Add redundancy to utilities (looped systems), provide spare generators and add capacity or systems to critical facility air conditioning requirements.

8.4.5. Reconstitution. Tear down, clean, repackage, inventory and turn-in government (including AFCAP contractor purchased) equipment where and to whom specified by task order or the contracting officer.

8.4.6. Restoration.

8.4.6.1. Remove temporary improvements to facilities, utilities, roads, etc.

8.4.6.2. Perform operations to return land to host nation in required condition.

8.4.6.3. Services (MWR and Services).

8.4.6.4. Provide food service support using field and garrison equipment and facilities. Contractor furnished equipment may be required. Preparation of up to four meals per day may be required using A, B and T rations. Distribute operational rations such as Meals Ready to Eat (MRE), as needed. Contractor shall maintain food accountability using task order prescribed procedures and

forms. Personnel working in food service must have current and documented food handlers training in accordance with AFMAN 34-240, *Food Service Program Management.*

8.4.6.5. Troop support—order, receive, store, issue, secure, and account for all subsistence to support food operations. Purchase subsistence directly from vendors (US or foreign national) and transport to the final destination. All purchases must be from sources approved by military public health as meeting public health standards.

8.4.6.6. Lodging. Provide central lodging processing point for allocation of space for various categories of personnel (i.e., male, female, officer, enlisted, aircrew, etc.). Operate locator system and provide housekeeping support. Use space in commercial quarters or contingency quarters as directed. Contractor furnished lodging facilities may be required.

8.4.6.7. Laundry. Provide laundry operations to support individual self-help, organizational, and medical requirements.

8.4.6.8. Fitness. Set up and manage individual and intramural sports activities. Provide, maintain, and monitor use of fitness equipment, facilities, and programs for strength and cardiovascular conditioning.

8.4.6.9. Recreation. Provide a variety of recreational and leisure time activities such as 16 or 35mm movies, VHS videos, table games, tours, equipment check-out, and reading materials (books, periodicals, newspapers, etc.). Provide electronic library reference material and an assortment of current newspapers.

8.5. Materiel Support.

8.5.1. Mobility/War Reserve Materiel (WRM)—e.g., BEAR, Harvest Falcon and Harvest Eagle assets.

8.5.2. Erection/Installation. Augment or relieve military forces in the erection/installation of mobility/WRM assets.

8.5.3. Existing Infrastructure. Perform routine operation, maintenance, repair, or renovation, including disassembly/reconstitution.

8.5.4. Contingency/Disaster Relief Materiel. Procure, transport and store materiel to support contingency and disaster relief operations. Support may include materiel management, handling and inventory.

8.6. General.

8.6.1. Real Property Leasing. As the task order scenario dictates, the contractor shall lease existing facilities and/or land in order to meet task order requirements, but only after explicit written Contracting Officer approval.

8.6.2. Land Clearing and Grubbing. Provide heavy equipment and operators to prepare land for use/occupancy, including creating and compacting subsurface support structures (base course, sub-base course, etc.); leveling for airfield surfaces, roads and facilities; sloping for drainage, etc.

8.6.3. Aircraft Gunnery Range Clearance Operations. Provide active range clearance operations at service Class A primary training ranges to include collection, inspection, disposal, and removal of all sub-scale practice bombs and unexploded ordnance.

8.6.4. Typical Construction. Typical AFCAP construction requirements are synonymous with initial and temporary joint service construction standards. The contractor shall use these standards to help determine the types of materials and construction techniques to be employed. These construction standards provide criteria that minimize construction efforts while providing facilities of a quality consistent with the mission requirements, personnel health and safety, and the expected availability of construction resources. These criteria can be met by commercial of f-the-shelf building systems that are rapidly erectable and yet have a life span that exceeds even the temporary standard if that alternative is cost or operationally effective.

8.6.5. Semi-Permanent and Permanent Construction. The contractor shall be capable of accomplishing semi-permanent and permanent construction. It is imperative that the scope and required specifications be explicitly called out within the definition of the task order. These requirements will generally be accomplished as a turn-key effort.

8.6.6. Backfill Support. MOOTW/SSC support may entail a requirement to augment the sustaining force at an Air Force base whether in CONUS or overseas. This back fill support will not be in the form of personal services.

8.7. Logistics Civil Augmentation Program (LOGCAP). LOGCAP is authorized by Army Regulation 700-137, *Logistics Civil Augmentation Program (LOGCAP)*. The Department of the Army's Deputy Chief of Staff, Logistics (DCSLOG) is the proponent, and the Army Corps of Engineers is the contracting activity. Its purpose is to use civilian contractors to perform selected services for military forces deployed to a theater of operations. The support includes transportation, food service, ice, potable water, laundry, showers, latrines, refuse removal, contingency equipment, and an unskilled labor pool. The mission statement requires the contractor, on order and within 15 days, to initiate specific logistical and engineering support for 20,000 arriving troops for up to 180 days.

8.7.1. LOGCAP should be accessed through the Army's theater level G4/S4 (Logistics and Engineering) staff or the CFACC Engineer (A7). LOGCAP is managed by the LOGCAP Support Unit (LSU) in Alexandria, Virginia. If you require direct access or have additional questions on LOGCAP organization, capabilities, and execution, contact the LSU at: AMCLG-TPU, LOGCAP Support Unit, 5001 Eisenhower Avenue, Alexandria, VA 22333-0001, (703) 617-0556 or call DSN 767-0556.

8.7.2. LOGCAP is primarily designed for use in areas where no bilateral or multilateral agreements exist. However, LOGCAP may provide additional support in areas with formal host nation support (HNS) agreements, where other contractors are involved, or where peacetime support contracts exist. LOGCAP is also available during Continental United States (CONUS) mobilizations to assist the CONUS support base and help units get ready for war.

8.7.3. LOGCAP includes all pre-planned logistics and engineering/construction oriented contingency contracts actually awarded. LOGCAP also includes peacetime contracts which include contingency clauses that provide rapid and responsive capability that augments US forces' capabilities by meeting logistics and engineering/construction requirements.

8.7.4. The Army has used contractors to provide supplies and services during both peacetime and contingencies dating back to the Revolutionary War. LOGCAP was established on 6 December 1985 with the publication of Army Regulation 700-137, *Logistics Civil Augmentation Program*. The newly established program was used in 1988 when the Third United States Army requested that the U.S. Army Corps of Engineers (USACE) contract out a management plan to construct and maintain two

petroleum pipeline systems in Southwest Asia in support of contingency operations. Since its inception, LOGCAP has supported US Army operations in Rwanda, Haiti, Saudi Arabia, Kosovo, Ecuador, Qatar, Italy, Southern Europe, Bosnia, Panama, Korea, Kuwait, Afghanistan, and Iraq.

8.7.5. LOGCAP capabilities include supply operations, clothing exchange and repair, mortuary affairs, billeting, facilities management, information management, transportation, engineering and construction, equipment retrograde, laundry, food services, hazardous waste disposal, personnel support to include MWR, maintenance, medical services, power generation and distribution, and other operations and services.

8.8. US Navy Contingency Construction Capabilities (CONCAP). The Navy's civilian augmentation program was started to enhance the Naval Facilities Engineering Command's (NAVFAC) ability to respond to global contingencies. The immediate need was to supplement the capabilities of local commanders and regional resources.

8.8.1. CONCAP provides the Navy and Marine Corps with a responsive contracting vehicle ready to respond to contingencies or natural disasters. It provides for indefinite deliveries and quantities using a cost-plus-award-fee contract for design, construction and services to support the Navy in war, disaster recovery, and military operations other than war. CONCAP is suitable for those situations in which the mission parameters exceed normal acquisition timing, there is an austere contingency environment, and facility requirements are not well defined.

8.8.2. The contract calls for a broad range of capabilities in both vertical and horizontal construction scenarios.

8.8.3. CONCAP helps the Navy stay within its force ceilings and frees uniformed Navy personnel for contingency operations. The contract specifies what may be required and includes time parameters for setting up quick, behind-the-lines facility support for troops. It also frees up Seabees to support the fight.

8.8.4. CONCAP capabilities include:

8.8.4.1. Horizontal/vertical construction (runways, roads, bridges, causeways, piers, berthing/messing facilities, depots, warehouses, clinics, field hospitals, operational/maintenance facilities, communications infrastructure, and ammunition dumps).

8.8.4.2. Specialty construction and engineering (dredging, aerial photography, soils engineering and surveys, operation of power generation, concrete and asphalt plants, POL facilities, and environmental restoration).

8.8.4.3. CONCAP's primary focus is to support day-to-day operations, construction, and management of Navy permanent bases. CONCAP is not a viable alternative for initial standard contingency construction, but can be utilized in the event AFCAP or LOGCAP are not available for large-scale permanent construction requirements at expeditionary beddown locations.

8.8.5. CONCAP has been utilized during requirements in Somalia, Haiti, and Bosnia; during Hurricane Andrew (October 1995), Hurricane Bertha (July 1996), and Hurricane Fran (September 1996). In 2002, CONCAP built detention facilities at Guantanamo Bay, Cuba.

8.9. Conclusion. The various contract augmentation programs offer the component/theater engineer and commander various options, other than utilization of limited military resources, to complete specified

expeditionary combat support services, construction, management, and logistics. The increased cost is worth the on-call capabilities that the programs offer. All programs must be accessed through the appropriate management function: AFCAP through AFCESA, at Tyndall AFB; LOGCAP via LSU in Alexandria, Virginia; and CONCAP through NAVFAC at the Washington Navy Yard in Washington DC.

8.10. Forms Adopted. AMC IMT 174, Air Field Survey; AF IMT 3822, Landing Zone Survey.

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DCS, Installations and Logistics

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

JP 1-02, *DOD Dictionary of Military and Associated Terms*

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AFH 10-222V1, *Guide to Bare Base Development*

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AFMAN 10-401V2, *Planning Formats and Guidance*

AFI 10-403, *Deployment Planning*

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AFI 32-1021, *Planning and Programming Military Construction (MILCON) Projects*

AFI 32-1022, *Planning and Programming Nonappropriated Fund Facility Construction Projects*

AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*

AFI 32-1024, *Standard Facility Requirements*

AFI 32-1041, *Airfield Pavement Evaluation Program*

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UFC 3-260-01, *Design: Airfield and Heliport Planning and Design*

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

UFC 4-010-02, *Design: DOD Minimum Standoff Distances for Buildings*

USAF War and Mobilization Plan, WMP-1, Annex S

29 CFR 1910.120(Q)

10 USC Sections 2803, 2804, 2805, 2802, 2350j

31 USC Section 1535

Abbreviations and Acronyms

ABD—airbase defense

AC—alternating current

ACH—aircraft hangar

ADR—airfield damage repair

ADVON—advance echelon

AEF—Air and Space Expeditionary Force

AETF—Air Expeditionary Task Force

AEW—Air Expeditionary Wing

AFCAP—Air Force Contract Augmentation Program

AFCESA—Air Force Civil Engineer Support Agency

AFDD—Air Force doctrine document

AFH—Air Force handbook

AFI—Air Force instruction

AFMAN—Air Force manual

AFN—American Forces Network

AFPAM—Air Force pamphlet

AFPD—Air Force policy directive

AFRES—Air Force Reserve

AFTH—Air Force theater hospital

AGE—aerospace ground equipment

ALCE—airlift control element

AMOG—air mobility operations group

ANG—Air National Guard

AO—area of operations

AOR—area of responsibility

AR—Army Regulation

ARFF—aircraft rescue and fire fighting

ASP—ammunition supply point

ASRR—airfield suitability and restrictions report

AT/FP—antiterrorism/force protection

BCE—base civil engineer

BEAR—basic expeditionary airfield resources

BRAAT—base recovery after attack

C2—command and control

C3—command, control and communications

CBRNE—chemical, biological, radiological, nuclear and high-yield explosive

CEMIRT—Civil Engineer Maintenance, Inspection and Repair Team

CESP—civil engineering support plan

CFACC—combined force air component commander

CFLCC—combined force land component commander

CFR—crash fire rescue; Code of Federal Regulations

CH—contingency hospital

COB—collocated operating base

COMSEC—communications security

CONCAP—contingency construction capability

CONEX—consolidated express (containers)

CRAF—Civil Reserve Air Fleet

CREST—contingency real estate support team

CRG—contingency response group

CSAF—Chief of Staff, Air Force

CSAR—Combat Search and Rescue

cu ft/sec—cubic foot per second

DA—Department of the Army

DC—direct current

DG—distributed generation

DODI—Department of Defense Instruction

EAF—Expeditionary Aerospace Force

ECU—environmental control unit

E-G—engine generator

EMEDS—Expeditionary Medical Support

EOD—explosive ordnance disposal

ESQD—explosive safety quantity distance

ESSP—expeditionary site survey process

FHA—Foreign Humanitarian Assistance

FOB—forward operating base

FOC—full operating capability

FOD—foreign object damage

FOL—forward operating location

FP—Force Provider

gal—gallons

gal/d—gallons per day

gal/m—gallons per minute (also gpm)

GMTF—global mobility task force

GP—general purpose

HCA—Humanitarian and Civic Assistance

HE—Harvest Eagle

HF—Harvest Falcon

HFPO—Health Facilities Planning Office

HN—host nation

hz—hertz

IC—internal combustion

IOC—initial operational capability

ISB—intermediate stage base

ISO—International Standardization Organization

JA—Judge Advocate

JCC—Joint Contracting Center

JCS—Joint Chiefs of Staff

JP—Joint Publication

JSP—joint support plan

JTF—joint task force

kW—kilowatt

LN—local national

LOGCAP—Logistics Civil Augmentation Program

MAJCOM—Major Command

MEP—mobile electric power

MILVAN—military van (container)

MOB—main operating base

MOC—minimum operating capability

MOG—maximum (aircraft) on ground

MOGAS—motor gasoline

MOOTW—military operations other than war

MOS—minimum operating strip

MSG—mission support group

MTF—medical treatment facility

MTMC—Military Traffic Management Command

MWR—Morale, Welfare and Recreation

NATO—North Atlantic Treaty Organization

NAVAID—navigational aid

NCC—network control center

NFPA—National Fire Protection Association

NSF—net square feet

OAF—Operation ALLIED FORCE

OEBGD—Overseas Environmental Baseline Guidance Document

OEF—Operation ENDURING FREEDOM

OIF—Operation IRAQI FREEDOM

O&M—operation and maintenance

OPLAN—operation plan

OPORD—operation order

OPSEC—operations security

PACAF—Pacific Air Forces

PEB—pre-engineered building

POL—petroleum, oils and lubricants

Prime BEEF—Prime Base Engineer Emergency Force

RALS—Remote Area Lighting System

RDS—records disposition schedule

RED HORSE—Rapid Engineer Deployable Heavy Operational Repair Squadron, Engineer

ROWPU—reverse osmosis water purification unit

SCIF—sensitive compartmented information facility

SEA—Southeast Asia

SF— Security Forces

SIPRNET—SECRET Internet Protocol Router Network

SSC—small scale contingency

STANAG—standardization agreement

STT—special tactics team

SWA—Southwest Asia

SWB—sanitary wall board

TACAN—tactical air navigation

TACC—tactical airlift control center

TALCE—tanker airlift control element

TEMPER—Tent Extendable Modular Personnel

TM—technical manual

TO—theater of operations; also, technical order

TPFDD—time-phased force and deployment data

TPFDL—time-phased force and deployment list

TRANSCOM—Transportation Command

TRICON—three isolation containers

UFC—Unified Facilities Criteria

ULN—unit line number

UPH—unaccompanied personnel housing

USACE—United States Army Corps of Engineers

USAFE—United States Air Forces in Europe

UTC—unit type code

UXO—unexploded explosive ordnance

V—volt

VA—volt-ampere

VAL—vehicle authorization list

VASI—visual approach slope indicator

WRM—war reserve materiel

Terms

agile combat support—An Air Force distinctive capability that encompasses the process of creating, effectively deploying and sustaining US military power anywhere—at our initiative, speed and tempo. Includes provisions and protection of air and space personnel, assets and capabilities throughout the full range of military operations. Also called ACS. (AFDD 2-4)

airbase defense—Those measures taken to nullify or reduce the effectiveness of enemy attacks on, or sabotage of, airbases to ensure that the senior commander retains the capability to accomplish assigned missions. (AFDD 2-4.1)

airfield damage repair—The process of using construction equipment, tools, portable equipment, expendable supplies and temporary surfacing materials to provide a minimum operating surface through expedient repair methods. Also called ADR.

Air Force Civil Engineer Support Agency—A field-operating agency located at Tyndall Air Force Base, Florida. The Contingency Support Directorate (CEX) acts as the Air Force program manager for base civil engineer contingency response planning. Also called AFCESA.

air strip—An unimproved surface which has been adapted for takeoff or landing of aircraft, usually having minimum facilities. (JP 1-02)

bare base—A base having minimum essential facilities to house, sustain and support operations to include, if required, a stabilized runway, taxiways, and aircraft parking areas. A bare base must have a source of water that can be made potable. Other requirements to operate under bare base conditions form a necessary part of the force package deployed to the bare base. (JP 1-02).

base denial—The destruction or denial of vital airbase resources so the enemy cannot use them against friendly forces or for his benefit.

base development—The improvement or expansion of the resources and facilities of an area or a location to support military operations.

base recovery after attack—A theater concept of recovering a base after conventional attack where resumption of flying operations is the first priority. Other recovery activities may be conducted concurrently; however, these activities must not impede the resumption of flying operations.

basic expeditionary airfield resources—Facilities, equipment, and basic infrastructure to support the beddown of deployed forces and aircraft at austere locations; a critical capability to fielding expeditionary aerospace forces. Also known as BEAR, the resources include tents, field kitchens, latrine systems, shop equipment, electrical and power systems, runway systems, aircraft shelters, and water distribution systems needed to sustain operations. Also called BEAR.

chemical defense—The methods, plans, and procedures involved in establishing and executing defensive measures against attack utilizing chemical agents.

chemical warfare—All aspects of military operations involving the employment of lethal and incapacitating munitions/agents and the warning and protective measures associated with such offensive operations. Since riot control agents and herbicides are not considered chemical warfare agents, those two items will be referred to separately or under the broader term "chemical", which will be used to include all types of chemical munitions/agents collectively. The term "chemical warfare weapons" may be used when it is desired to reflect both lethal and incapacitating munitions/agents of either chemical or biological origin.

collocated operating base—An active or reserve allied airfield designated for joint or unilateral use by US Air Force wartime augmentation forces or for wartime relocation of US Air Force in-theater forces. Collocated operating bases are not US bases. Also called COB.

combined force—A military force composed of elements of two or more allied nations. (JP 1-02)

command and control—The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities and procedures employed by a commander in planning, directing, coordinating and controlling forces and operations in the accomplishment of the mission. Also called C2.

Continental United States—United States territory, including the adjacent territorial waters, located within North America between Canada and Mexico. Also called CONUS.

contingency—An emergency involving military forces caused by natural disasters, terrorists, subversives, or by required military operations. Due to the uncertainty of the situation, contingencies require plans, rapid response and special procedures to ensure the safety and readiness of personnel, installations and equipment.

contingency plan—A plan for major contingencies that can reasonably be anticipated in the principal geographic sub areas of the command.

contingency response plan—A base civil engineer plan of action developed in anticipation of all types of contingencies, emergencies, and disasters.

conventional weapons—A weapon, which is neither nuclear, biological, radiological, nor chemical.

convoy—A group of vehicles organized for the purpose of control and orderly movement with or without escort protection.

country team—The senior, in-country, US coordinating and supervising body, headed by the chief of the diplomatic mission, usually an ambassador, and composed of the senior member of each represented US department or agency, as desired by the chief of the US diplomatic mission. (JP 1-02)

decontamination—The process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing, chemical or biological agents, or by removing radioactive material clinging to or around it.

deploy—To relocate a unit, or an element thereof, to a desired area of operations or to a staging area. Deployment will be accomplished with all required personnel and equipment. Deployment begins when the first aircraft, personnel, or item of equipment leaves the home base. The force is deployed when the last component of the unit has arrived.

explosive ordnance disposal—The detection, identification, on-site evaluation, rendering-safe, recovery, and final disposal of unexploded explosive ordnance. It may also include explosive ordnance that has become hazardous by damage or deterioration. Also called EOD.

explosive ordnance reconnaissance—Reconnaissance involving the investigation, detection, location, marking, initial identification, and reporting of suspected unexploded explosive ordnance by explosive ordnance reconnaissance agents, in order to determine further action. Also called EOR.

forward operating base—An airfield used to support tactical operations without establishing full support facilities. The base may be used for an extended period. Support by a main operating base will be required to provide backup support for a forward operating base. Also called FOB. (JP 1-02)

Harvest Eagle—The operational name for an air transportable package of housekeeping equipment, spare parts, and supplies required for support of US Air Force general-purpose forces and personnel in bare base conditions. Examples of Harvest Eagle equipment are water purification units, tents, and showers. Each kit is designed to provide soft wall housekeeping support for 550 personnel.

Harvest Falcon—The operational name given to a selected package of mobile facility, utility, and equipment assets required to support forces and aircraft under bare base conditions. These WRM assets are packaged in air transportable sets to include housekeeping, industrial, initial flightline, and follow-on flightline. Harvest Falcon sets are designed to support increments of 1,100 personnel and squadron size aircraft deployments.

initial operating capability—The first attainment of the capability to employ effectively a weapon, item of equipment, or system of approved specific characteristics that is manned or operated by an adequately trained, equipped, and supported military unit or force.

joint force—A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments operating under a single joint force commander. (JP 1-02)

joint force air and space component commander—The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and made available for tasking air forces; planning and coordinating air operations; or accomplishing such operational missions as may be assigned. The joint force air and space component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. Also called JFACC. (JP 1-02)

joint force land component commander—The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, or made available for tasking land forces; planning and coordinating land operations; or accomplishing such operational missions as may be assigned. The joint force land component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. Also called JFLCC. (JP 1-02)

joint force sea component commander—The designated, centralized commander for all theater sea operations. Also called JFSCC. (JP 1-02)

joint force special operations component commander—The designated, centralized commander for all theater special operations. Also called JFSOCC. (JP 1-02)

joint support plan—A plan for the reception and beddown of forces that is collectively developed by the host nation, the theater in-place sponsor, and the affected augmentation unit. The plan outlines all facets of operations at a collocated operating base to include personnel, facilities, and equipment. Also called JSP.

main operations base—In special operations a base established by a joint force special operations component commander or a subordinate special operations component commander in friendly territory to provide sustained command and control, administration, and logistical support to special operations activities in designated areas; also called MOB. (JP 1-02). Also, a base on which all essential buildings and facilities are erected and organizational and intermediate maintenance capability exists for assigned weapon systems. The intermediate maintenance capability may be expanded to support specific weapon systems deployed to the main operating base. Also called main ***operating*** base.

military operations other than war—Operations that encompass the use of military capabilities across the range of military operations short of war. These military actions can be applied to complement any combination of the other instruments of national power and occur before, during, and after war. (JP 1-02)

military van—(container)—Military-owned, demountable container, conforming to US and international standards, operated in a centrally controlled fleet for movement of military cargo.

minimum operating strip—A runway which meets the minimum requirements for operating assigned and/or allocated aircraft types on a particular airfield at maximum or combat gross weight. (JP 1-02). Also called MOS.

mobility—A quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfill their primary mission.

net square feet—The floor area in any building or structure. Sometimes referred to as net usable square feet.

operation plan—Any plan, except for the Single Integrated Operation Plan, for the conduct of military operations. Plans are prepared by combatant commanders in response to requirements established by the Chairman of the Joint Chiefs of Staff and by commanders of subordinate commands in response to requirements tasked by the establishing unified commander. Operation plans are prepared in either a complete format (OPLAN) or as a concept plan (CONPLAN). The CONPLAN can be published with or without a time-phased force and deployment data (TPFDD) file.

a. OPLAN—An operations plan for the conduct of joint operations that can be used as a basis for development of an operation order (OPORD). An OPLAN identifies the forces and supplies

required to execute the combatant commander's strategic concept and a movement schedule of these resources to the theater of operations. The forces and supplies are identified in TPFDD files. OPLANs will include all phases of the tasked operation. The plan is prepared with the appropriate annexes, appendixes and TPFDD files as described in the Joint Operation Planning and Execution System manuals containing planning policies, procedures, and formats.

b. CONPLAN—An operations plan in an abbreviated format that would require considerable expansion or alteration to convert it into an OPLAN or OPORD. A CONPLAN contains the combatant commander's strategic concept and those annexes and appendixes deemed necessary by the combatant commander to complete planning. Generally, detailed support requirements are not calculated and TPFDD files are not prepared.

c. CONPLAN with TPFDD—A CONPLAN with TPFDD is the same as a CONPLAN except that it requires more detailed planning for phased deployment of forces. (JP 1-02)

Overseas Environmental Baseline Guidance Document—A set of objective criteria and management practices developed by the Department of Defense to protect human health and the environment. (JP 1-02). Contains procedures to establish the final governing standards for a particular geographic area or to provide standards for environmental compliance where no final governing standards have been established. Also called OEBGD.

potable water—Water that is safe for consumption.

Prime BEEF (Base Engineer Emergency Forces)—A Headquarters US Air Force, major command (MAJCOM), and base-level program that organizes civil engineer forces for worldwide direct and indirect combat support roles. It assigns civilian employees and military personnel to both peacetime real property maintenance and wartime engineering functions.

RED HORSE (Rapid Engineer Deployable Heavy Operational Repair Squadron, Engineer—)—Air Force units that are wartime-structured to provide a heavy engineer capability. They have a responsibility across the operational area, are not tied to a specific base, and are not responsible for base operation and maintenance. These units are mobile, rapidly deployable, and largely self-sufficient for limited periods of time.

reverse osmosis water purification unit—A water purification device that uses a series of membranes to eliminate impurities. It is capable of removing dissolved minerals. Also called ROWPU.

sanitary sewer—A sewage system that carries only domestic sewage.

Standardization Agreement (NATO)—The record of an agreement among several or all of the member nations to adopt like or similar military equipment, ammunition, supplies and stores; and operational, logistic and administrative procedures. National acceptance of a NATO allied publication issued by the Military Agency for Standardization may be recorded as a Standardization Agreement. Also called STANAG.

standoff—A physical distance separation to minimize the damage done by hand-held weapons.

survivability—Capability of a system to accomplish its mission in the face of an unnatural (man-made) hostile, scenario-dependent environment. Survivability may be achieved by avoidance, hardness, proliferation, or reconstitution (or a combination).

time-phased force and deployment data—The Joint Operation Planning and Execution System database portion of an operation plan; it contains time-phased force data, non-unit-related cargo and personnel data and movement data for the operation plan, including the following:

a. In-place units;

b. Units to be deployed to support the operation plan with a priority indicating the desired sequence for their arrival at the port of debarkation;

c. Routing of forces to be deployed;

d. Movement data associated with deploying forces;

e. Estimates of non-unit-related cargo and personnel movements to be conducted concurrently with the deployment of forces;

f. Estimate of transportation requirements that must be fulfilled by common-user lift resources as well as those requirements that can be fulfilled by assigned or attached transportation resources; also called TPFDD. (JP 1-02)

time-phased force and deployment list—Appendix 1 to Annex A of the operation plan. It identifies types and/or an actual unit required to support the operation plan and indicates origin and ports of debarkation, or ocean area. It may also be generated as a computer listing from the time-phased force and deployment data. Also called TPFDL. (JP 1-02)

unimproved surface—A takeoff and landing surface that has not been improved through paving with asphalt, concrete, or other durable substance; for example, a grass or dirt landing strip.

unit line number—A seven-character alphanumeric code that describes a unique increment of a unit deployment, i.e., advance party, main body, equipment by sea and air, reception team, or trail party, in a Joint Operation Planning and Execution System time-phased force and deployment data. (JP 1-02)

unit type code—A Joint Chiefs of Staff developed and assigned code, consisting of five characters that uniquely identify a type unit. (JP 1-02). Also called UTC.

United States Transportation Command—The unified command with the mission to provide strategic air, land and sea transportation for the Department of Defense, across the range of military operations.

war reserve materiel—Materiel required in addition to primary operating stocks and mobility equipment to attain the operational objectives in the scenarios authorized for sustainability planning in the Defense Planning Guidance. Broad categories are: consumables associated with sortie generation (to include munitions, aircraft external fuel tanks, racks, adapters, and pylons); vehicles; 463L systems; materiel handling equipment; aircraft engines; bare base assets; individual clothing and equipment; munitions; and subsistence. Also called WRM.

Attachment 2

RECOMMENDED CE UTC BASED ON MISSION REQUIREMENTS

Table A2.1. Recommended CE UTCs for One Fighter Squadron Deployment.

	Low Threat			Medium Threat			High Threat		
UTC	**#**	**Personnel**	**Total**	**#**	**Personnel**	**Total**	**#**	**Personnel**	**Total**
4FPEA	1	55	55	1	55	55	1	55	55
4FPEP	2	25	50	2	25	50	2	25	50
Traditional CE			**105**			**105**			**105**
4FPFJ	3	2	6	3	2	6	3	2	6
4F9FN	1	1	1	1	1	1	1	1	1
4F9FA	1	1	1	1	1	1	1	1	1
4F9FP	11	6	66	11	6	66	11	6	66
Fire Fighters			**74**			**74**			**74**
4F9DA							1	2	2
4F9DB	1	2	2	2	2	4	2	2	4
4F9DC	2	3	6	7	2	14	11	2	22
Readiness			**8**			**18**			**28**
4F9X1	1	6	6	1	6	6	1	6	6
4F9X2	1	4	4	1	4	4	2	4	8
4F9X3	1	2	2	1	2	2	1	2	2
4F9X9				1	2	2	1	2	2
4F9XA				1	2	2	2	2	4
EOD			**12**			**16**			**22**
Total Personnel			**199**			**213**			**229**

Table A2.2. Recommended CE UTCs for a 2 Fighter Squadron Deployment.

	Low Threat			Medium Threat			High Threat		
UTC	**#**	**Personnel**	**Total**	**#**	**Personnel**	**Total**	**#**	**Personnel**	**Total**
4FPEA	1	55	55	1	55	55	1	55	55
4F9EB	1	42	42	1	42	42	1	42	42
4FPEP	2	25	50	2	25	50	2	25	50
4F9AP	1	4	4	1	4	4	1	4	4
Traditional CE			**151**			**151**			**151**
4FPFJ	3	2	6	3	2	6	3	2	6
4F9FN	1	1	1	1	1	1	1	1	1
4F9FA	1	1	1	1	1	1	1	1	1
4F9FP	11	6	66	11	6	66	11	6	66
Fire Fighters			**74**			**74**			**74**
4F9DA							1	2	2
4F9DB	1	2	2	2	2	4	2	2	4
4F9DC	3	2	6	7	2	14	11	2	22
Readiness			**8**			**18**			**28**
4F9X1	1	6	6	1	6	6	1	6	6
4F9X2	1	4	4	1	4	4	2	4	8
4F9X3	1	2	2	1	2	2	1	2	2
4F9X9				1	2	2	2	2	4
4F9XA				1	2	2	1	2	2
EOD			**12**			**16**			**22**
Total Personnel			**245**			**259**			**275**

Table A2.3. Recommended CE UTCs for a 3 or More Fighter Squadron Deployment.

	Low Threat			Medium Threat			High Threat		
UTC	**#**	**Personnel**	**Total**	**#**	**Personnel**	**Total**	**#**	**Personnel**	**Total**
4FPEA	1	55	55	1	55	55	1	55	55
4F9EB	2	42	84	2	42	84	2	42	84
4FPEP	2	25	50	2	25	50	2	25	50
4F9AP	4	2	8	4	2	8	4	2	8
Traditional CE			**197**			**197**			**197**
4FPFJ	3	2	6	3	2	6	3	2	6
4F9FN	1	1	1	1	1	1	1	1	1
4F9FA	1	1	1	1	1	1	1	1	1
4F9FP	11	6	66	11	6	66	11	6	66
Fire Fighters			**74**			**74**			**74**
4F9DA							1	2	2
4F9DB	1	2	2	2	2	4	2	2	4
4F9DC	3	2	6	7	2	14	11	2	22
Readiness			**8**			**18**			**28**
4F9X1	1	6	6	1	6	6	1	6	6
4F9X2	1	4	4	1	4	4	2	4	8
4F9X3	1	2	2	1	2	2	1	2	2
4F9X9				1	2	2	2	2	4
4F9XA				1	2	2	1	2	2
EOD			**12**			**16**			**22**
Total Personnel			**291**			**305**			**321**

Attachment 3

MAIN OPERATING BASE AUTHORIZED FACILITIES/CONSTRUCTION STANDARDS

A3.1. Main Operating Base (MOB) Facilities. MOBs are occupied by a wing or larger unit (US population of 500 or more) and are continuously operated camps with command, staff and logistic functions. The standards outlined in this section apply to all MOBs. Since the initial construction standards consist mainly of unit organic equipment or bare base deployable assets, the discussion below concentrates primarily on temporary construction standards.

A3.2. Roads. Primary roads identified by commanders on base camp master plans are authorized for paving with asphalt. Primary roads are considered as major arteries that support the majority of vehicle traffic through the base. Concrete turning pads are authorized to prevent damage to asphalt roads. Secondary and perimeter patrol roads are to be surfaced with gravel.

A3.3. Dining Facilities. Dining facilities will provide 640 sq ft of dining room space and 320 total sq ft of kitchen, admin and storage space per 750 assigned personnel. Adequate space for cleaning, latrine, and clothes changing for local national kitchen staff will be provided. Sanitary wall board (SWB) or other waterproof material will be used in the kitchen and latrine areas. Loading dock can be concrete, asphalt, or treated lumber. Portable sanitary hand-washing stations will be located at the entrance of the dining facility.

A3.4. Lodging Standards. **Table A3.1.** gives the authorized square footage for unaccompanied personnel housing (UPH) space for deployed military personnel, government mission essential civilians, and assigned DOD contractors. **Table A3.2.** gives the authorized square footage for UPH billeting space for civilians and contractors who are deployed greater than 6 months. **Table A3.3.** gives the authorized square footage for UPH billeting space for military personnel deployed greater than six months.

Table A3.1. Contingency Lodging Standards.

Category	Number Per Standard TEMPER Tent (or equivalent) (16’ x 32’)	Number Per Standard Modular (8’ x 20’)
E1-E5; GS-5 & below, NF 1/2; Civilian WG 1-11 or WL 1-5; Contracted Laborers	6	2
E6-E7; O1/2; GS 6-9, NF 3; Civilian WS 1-7	4	2
E8, O3/4; GS 10-12, NF4;	3	2
E-9, O5/6; GS 13-15, NF5	2	1
O7; SES; NF6	1	1

Table A3.2. Housing Standards for Long-term Civilian/Contractor Employees (>6 mo.s).

Category	TEMPER Tent/SEA hut (or equivalent) (16' X 32')	Number Per Standard Container (8' X 20')
GS 8 & Below; NF 1/2; Civilian WG 1-11 or WL 1-5	2 Personnel/Room (16' x 16') with 2 Rooms/SEA hut	1
GS 9-12; NF 3; Civilian WS 1-7; Educators Schedule C1-3	1 Personnel/Room (8' x 16') with 4 Rooms/SEA hut	1
GS 13 & Above; NF4; Educators Schedule C4 & Above; D-F, M-O and Teaching Principals – Schedule L	1 Personnel/Room (16' x 16') with 2 Rooms/SEA hut	1

Table A3.3. Housing Standards for Long-term Military Personnel (>6 Months).

Category	TEMPER Tent/SEA hut (or equivalent) (16' x 32')	Number Per Standard Container (8' x 20')
E1-E6	2 Personnel/Room (16' x 16') with 2 Rooms/SEA hut	1
E7-E8, WO1/2, CW3/4, O1-O4	1 Personnel/Room (8' x 16') with 4 Rooms/SEA hut	1
E-9, CW5, O5-O6	1 Personnel/Room (16' x 16') with 2 Rooms/SEA hut	1
O7; SES; NF6	1 Personnel/Room (16' x 32') with 1 Room/SEA hut	1

A3.4.1. The US Army utilizes the South-East Asia Hut (SEA hut) as its base module for temporary and semi permanent construction standard billeting. The SEA hut is a wood framed, elevated building with exterior covered walkways that is utilized for billeting. SEA Huts are normally grouped together and are collocated with a latrine and shower huts. Standard SEA huts are 512 square feet, with a standard SEA hut cluster having five bays and a latrine (2,944 sq ft). SEA hut structures provide a greater degree of safety and comfort than hard backed GP Mediums or TEMPER tent. SEA huts may be subdivided for individual rooms and common areas based on grade/rank of inhabitants. SEA huts provide an expedient and more cost effective solution than contracted modular facilities as they are easily fabricated by either contract or military labor. SEA huts organized in this manner minimize the distance personnel are required to walk to shower and latrine facilities and increases unit cohesion by maintaining company, platoon and squad integrity.

A3.4.2. Private (modular or partitioned SEA hut) and semi-private billeting space for the housing of long-term (exceeding 6 months) government civilian/ all contractor employees and airmen should be considered at the earliest possible time. The Theater Engineer (A7) will determine grade equivalencies for DOD contractor employees. The MSG Commander is delegated the responsibility to resolve private room availability for long-term civilian/contractor employees and airmen at their assigned airbase.

A3.4.3. All 110/220 volt electric outlets in billeting facilities will be protected by not more than 30 amp ground fault circuit interrupter. Highest protection level will be selected to protect against electric shock hazard. Where practical, billeting should be configured into clusters with shower, shave and latrine units collocated within the clusters. Standard 5' (minimum width) covered walkways should be provided to allow personnel to walk under cover to latrine units. Sufficient space will be maintained between facilities to allow fire trucks and other safety vehicles driving space. Carpet is not authorized in living or office areas.

A3.4.4. Minimum authorized government provided furniture per deployed person (units presently exceeding this standard are authorized to keep the excess furnishings on hand).

A3.4.4.1. One bed, bunk/single.

A3.4.4.2. One foot locker.

A3.4.4.3. One wall unit with shelves and hanging area.

A3.4.4.4. One desk with chair.

A3.4.4.5. One dresser.

A3.4.4.6. Locally built shelves made of plywood.

A3.4.5. Surge Housing. All base camps will maintain the ability at all times to house 10% of total population as transients and surges. During surge periods that exceed 10%, Tier II tents (maximum) will be used for housing. Tier level for tents is as follows.

A3.4.5.1. Tier I consists of GP Medium field tents or equivalent (TEMPER, 16' x 32') with plywood floor panels.

A3.4.5.2. Tier II consists of a GP Medium field tent or equivalent (TEMPER) with plywood floor panels, two electric light outlets, two electrical outlets, and space heaters.

A3.4.5.3. Tier III consists of a GP Medium field tent or equivalent (TEMPER), full wooden frame for tent, plywood panel sidewalls, raised insulated flooring, four electric light outlets, eight electrical outlets, and Environmental Control Units (ECUs).

A3.4.6. VIP/DV Billets. Each MOB hosting a JTF or Combatant Commander is authorized 2,944 sq ft (or 6 TEMPER tent equivalent) for VIP/DV billets. All other MOBs are authorized 512 sq ft (or one TEMPER tent equivalent) for VIP/ DV billets.

A3.5. Latrines and Shower Facilities. Toilet and shower facilities will be lighted, heated and equipped with hot and cold water. SWB is the preferred wall covering for latrines. Sheetrock, if used, must be waterproof, with a waterproof finish for cleaning.

A3.5.1. A shower head/population ratio of 1:10 is the goal for all base camps.

A3.5.2. A toilet/population ratio of 1:10 is the goal for all base camps.

A3.6. JTF, CFACC or equivalent HQ. The size of the HQ is situation dependent, based on the standards in **Table A3.4.** The component commander has approval authority over the final design. The HQ should include, but is not limited to:

A3.6.1. Standard FE-6 Chain Link fence with outrigger.

A3.6.2. Gravel parking lots (asphalt parking authorized when mission considerations allow).

A3.6.3. Exterior security lighting that can be turned off using a single emergency switch that is available to the manned security forces entry control point.

A3.6.4. Sensitive Compartmented Information Facility (SCIF). Constructed to initial standards and upgraded to comply with Director of Central Intelligence Directive 1/21, *SCIF Construction*.

A3.6.5. A facility to house the AOC operation.

A3.6.6. Modular/SEA hut style buildings for primary staff offices.

A3.6.7. Communications platforms and shelters.

A3.6.8. Personal protection bunkers.

A3.6.9. Entry control point and guard shacks.

Table A3.4. Utilization Guidelines for Office Space.

PERSONNEL	MAXIMUM NSF/PERSON
Private Offices	
Brigadier Generals (O7) and above	300
Colonel, O5 Commanders, GS-15, Command CMSgt	200
O5, O4 Commanders, GS-13/14, Wing Command Chief	150
MAJ, O3 Commanders, GS-12, CMSgt (E9), 1st Sergeants (Any Grade)	100
Open Offices	
GS-9/11, E8, O1-O3	110
GS-7, E7	90
E1-E6, GS6 and Below	60

NOTES:

- Planning numbers only apply to military units/organizations and personnel. Admin space for MWR and commercial functions are discussed separately.

- To calculate total building size, add an additional 40% for central files, hallways, storage, copier, mail, and conference rooms.

A3.7. Supply Warehouse. Each task force is authorized a supply warehouse facility. The size of the facility is dependent upon equipment density, base population and classes of supply to be supported. Warehouses are for long-term storage. Military Van (MILVAN) containers are for transportation only. MILVANs will be unloaded promptly, less than 7 working days, and returned to the transportation system. Leased MILVANs will never be held for storage or modified; holes cut or parts welded on. Warehouses will not be used for long-term housing of excess government property. Each wing is authorized a 10,000 sq ft warehouse.

A3.8. Individual Equipment Unit (IEU) Warehouse. Each air expeditionary wing is authorized an IEU with a gravel holding yard with chain link fence. The IEU facility space is authorized at a rate of 1,000 sq ft per 1,000 personnel supported.

A3.9. Finance and Personnel Support. Each air expeditionary wing is authorized a Finance Center and Military Personnel Flight (MPF) facility. Finance and MPF are each authorized 1,024 sq ft. The Finance Flight requires a 5'x 8' pay cage, an 8'x 9' walk-in vault, and a customer service area.

A3.10. Laundry Collection/Distribution Point. This operation is authorized 512 sq ft of space per 500 authorized users.

A3.11. Air Expeditionary Wing Headquarters (AEW HQ) Facilities. A maximum of 5,376 sq ft of space is authorized for the AEW HQ. AEW HQ facilities are also authorized the following:

A3.11.1. Gravel parking lots (asphalt parking authorized when mission considerations allow).

A3.11.2. Exterior security lighting that can be turned off using a single emergency switch that is available to the manned security forces entry control point.

A3.11.3. Modular or SEA hut style facility construction standards.

A3.11.4. Personnel protection bunkers for AEW Group HQ Facilities. A maximum of 3,840 sq ft of space is authorized for housing the HQ elements of each AEW group command staff (mission support group, operations group, maintenance group, and medical group). This space is intended to house the group's command staff, mailroom, group administrative functions, executive officer, command chief, first sergeant, and other associated support elements.

A3.11.5. Squadron HQ Facilities. Each AEW squadron is authorized a maximum of 1,536 sq ft of space for the command staff, administrative office, orderly rooms, conference, storage, and supply rooms.

A3.12. Aviation Facilities. Runways, taxiways, parking aprons, maintenance areas, and helipads should be sited, planned, and constructed IAW UFC 3-260-01, *Design*: *Airfield and Heliport Planning and Design.*

A3.13. Helicopter Pads. Helicopter landing and parking pads will initially be AM-2 matting surfaced to prevent foreign object damage (FOD). Helicopter landing and parking pads will be concrete, with asphalt aprons. The pads will have adequate grounding rods and tie-downs. All soil in the immediate area of the pads will be planted in grass or gravel large enough not to become FOD. Hot pads will have HESCO bastions or similar material to minimize damage from accidental weapons discharge.

A3.13.1. Lighted Landing Pad. One helicopter landing pad on each base camp will be outfitted with nighttime landing lights. This will facilitate landing of helicopters for emergency operations.

A3.13.2. Vehicle Parking Area. An 11,000 sq ft vehicle graveled parking area is authorized for helicopter pads. This area is intended for the parking of service and maintenance vehicles associated with helicopter operations.

A3.14. Forward Area Refuel Point. If pipe is used it will be double walled stainless steel with return line. Aviation quality fuel filters will be used. Pads will be concrete, as will any area where fuel spills are likely. Blast protection will be installed around the fueling pads.

A3.15. Control Tower. Control tower will be of sufficient size and height for unobscured vision of the entire airfield. The tower can be either wood or metal, grounded, with adequate priming and painting to prevent weather damage and minimize slip hazard in bad weather.

A3.16. Squadron Operations. 10,000 sq ft of space is authorized for Squadron Operations.

A3.17. Aviation Maintenance. Total number of aviation clamshell tents is based on mission requirements. Tow ways will be paved from the aprons, hardstands, and helipads to the maintenance clamshell tents. (Aviation ground vehicle maintenance considered separately under Maintenance Facilities).

A3.18. Helicopter and Aviation Wash Racks. Wash racks for helicopter and aircraft are authorized. The wash racks will have a storage tank and concrete pad with a drainage system equipped with an oil water separator.

A3.19. Communications Compound/Network Control Center (NCC). Each AEW is authorized one Communications Compound/NCC. The facility size requirement is dependent upon the wing organization and supported units and missions. Bases that host JTF or higher level headquarters functions will require a significantly larger area. Consult theater level CE and communications planners for further direction. Basic planning guidelines are as follows: up to 1,500 main operating base (MOB) personnel = 2,944 sq ft; 1,500 to 3,000 personnel = 4,736 sq ft; 3,000 to 5,000 personnel = 6,208 sq ft; greater than 5,000 personnel = 9,152 sq ft. NCC compounds are authorized the following:

A3.19.1. Standard FE-6 Chain Link fence with outrigger.

A3.19.2. Gravel parking lots (asphalt parking authorized when mission considerations allow).

A3.19.3. Exterior security lighting that can be turned off using a single emergency switch that is available to the manned security forces entry control point.

A3.20. Expeditionary Medical Support (EMEDS) System. For final planning consult with the theater medical planner to determine which level of EMEDS will be deployed. The largest deployed EMEDS planning factor is for an EMEDS+ 114 theater hospital and staging area. EMEDS+ 114 requires 400-kW of power, 11,000 gallons of potable water per day, 675 pounds of ice per day, and produces 11,286 gallons of waste water and 4,500 pounds of solid waste per day. Additional information regarding EMEDS planning can be found in AFPAM 10-219, Volume 5.

A3.20.1. Special Medical Requirements. The following spaces will include a sink with running hot and cold water: examination rooms, trauma/treatment rooms, laboratory and dental treatment rooms. Dental sterilization radiology rooms will require lead shielding appropriate to the type of radiology equipment utilized. This includes all four walls and servicing door (lead shielded). The minimum thickness level and specifications for installation may be determined through consultation with the supporting Health Facilities Planning Office (HFPO) or Preventive Medicine Office. Specific consideration should be given to ensure ventilation from the x-ray development, dental sterilization and laboratory spaces. Finished materials should support infection control measures by incorporating smooth

washable surfaces with limited seams throughout. All interior partitions shall be constructed from the floor to the underside of the ceiling and will not be undercut or left open at the top. Lighting and electrical requirements for each space will be coordinated with HFPO in consideration of existing and planned medical equipment.

A3.20.2. Air Force Transportable Hospital (AFTH) Location. Locate medical facilities on the base to support the command's mission requirements. Consideration should be given to daily sick call operations and the relative proximity to the troop population and emergency medical operations (evacuation operations both into and out of the clinic by ground and air). The standard base camp clinic will be sized to meet the medical and dental care expectations of the population stipulated in the operations order and supported by the medical staff.

A3.21. Maintenance Facilities. Each AEW should strive to consolidate maintenance activities as much as possible. A facility size at a rate of 1,840 sq ft per AEW Group supported by the facility is authorized. If a squadron-sized facility is required, then a 1,200 sq ft maintenance facility is authorized. These facilities will be equipped with inside and outside lights, as well as exhaust fans and compressed air.

A3.22. Maintenance (MX) Administration. 640 sq ft of office space is authorized for each MX flight.

A3.23. Maintenance Parking Area. Each MX group is authorized a parking area of a sufficient size to accommodate outside maintenance of wing vehicles. Pads should be large enough to accommodate the largest vehicle maintained plus a recovery vehicle. Maintenance pads for tracked and wheeled vehicles (if supported by base MX) will be constructed from concrete. Maintenance pads will be located near the unit maintenance bay, usually as aprons to a consolidated maintenance facility.

A3.24. Fuel Storage. Above ground fuel tanks are authorized for the storage of bulk fuels. Fuel storage bladders will be phased out as above ground storage tanks become available. Tanks will be constructed IAW existing environmental regulations and installed per manufacturer recommendations. Where it is necessary to use fuel bladders, they will be sited IAW environmental guidelines and will be surrounded by a constructed containment structure large enough to contain the maximum amount of fuel in the bladder to contain any spillage. Fuel truck parking will have secondary containment pads equipped with a catchment sump and grounding rods.

A3.25. Hazardous Waste Collection Points. Each AEW Group will have a covered hazardous waste collection point, built on an elevated pad, to be out of contact with ground surface and have permanent secondary containment system. AEW commanders may authorize additional collection points at bases as required to support their mission.

A3.26. Hazardous Material Warehouse. Each AEW is authorized a hazardous materials warehouse at a size rate of 1,000 sq ft per 1,000 assigned personnel.

A3.27. Parking Lots. Parking lots should be constructed using well-graded rock and compacted, with engineered slope and drainage to minimize weather effects and increase safety. Avoid loose rocks greater than 30-40. The purpose is to minimize damage to gravel parking lots and to prevent damage to vehicles from flying rocks. Wooden parking lot stripes are not authorized. Concrete turning pads are authorized for parking of tracked vehicles. Chain link fences around motor pools are not authorized unless they are part of the perimeter fence.

A3.28. Direct Support Maintenance. Direct Support Maintenance and Allied Trades is authorized 2,050 sq ft per 1,000 MOB personnel supported, including admin space.

A3.29. Kennels. Military working dogs are authorized a lighted, climate controlled kennel and an exercise yard. Kennels will have individual stalls (dog run) for each animal and a sealed concrete floor for health reasons and ease of cleaning. Kennel floor drains should be connected to a sewer system. The kennel-planning factor is 145 sq ft per dog, which includes kitchen, tack room and interior dog run, (36 sq ft per dog). Exterior dog runs should be 48 sq ft per dog, with a connecting guillotine-type door to the interior dog run. Additional information is located in AFI 31-202, *Military Working Dog Program*.

A3.30. Morgue. Each morgue is authorized 512 sq ft of workspace and a refrigeration van. Privacy screen is authorized around the entire facility.

A3.31. Defense Reutilization and Marketing Office. One recycling facility per task force is authorized at a size of one sq ft per MOB employee (e.g. soldier, civilian, host country national). It should have concrete or asphalt floor capable of handling forklifts.

A3.32. Ammunition Supply Point (ASP). The ASP, if applicable to the base camp, will not house ammunition in containers. If the mission dictates containers be temporarily used, then only DOD-owned containers will be used. Any DOD containers used must be a temporary arrangement until bunkers can be constructed. The ASP will be constructed with bunkers and space allocations (safety requirements) to meet the net explosive weight of the planned stored ammunition. Consult theater CE and SFS planners for additional guidance.

A3.33. Basic Load and Captured Ammunition Holding Areas. Ammunition holding areas will be constructed in accordance with AR 385-64, *U.S. Army Explosives Safety Program*, and DA PAM 385-64, *Ammunition and Explosives Safety Standards*. Ammunition holding areas will have containment berms, a fenced and lighted perimeter, graveled access roads and lightning protection for the entire area. Ammunition will be stored in protective structures such as MILVAN containers that are out of contact with the ground (on wooden sleepers or on concrete foundations).

A3.34. Wash Rack. Each MOB is authorized at minimum one 45’ long elevated vehicle wash rack, one 100’ flat wash rack and one container wash rack equipped with oil/water separators. Wash racks shall be designed to fit the largest and heaviest vehicles in the fleet.

A3.35. Fire Protection. Provide Fire and Emergency Response services in accordance with DODI 6055.6, *DoD Fire and Emergency Services Program*; DODI 2000.18, *DoD Installation Chemical, Biological, Radiological, Nuclear and High-Yield Explosive Emergency Response Guidelines*; AR 420-90, *National Fire Protection Association Codes*, and the following standards:

A3.35.1. Fire Departments will be established only at base camps with a population of 1,000 or more US personnel (permanent residents), or where US Air Force flight operations and/or Army rotary-wing flight operations dictate based on flightline response requirements. Refer to theater CE Fire Planner to dictate requirements as they are based on assigned weapons systems.

A3.35.2. Base camps that do not meet the criteria above will use appropriate portable fire extinguishers. Fire and emergency personnel will be properly trained on the use of extinguishers.

A3.35.3. The AOR Fire Chief, in coordination with the theater CE (A7), will determine the type and number of fire extinguishers required.

A3.35.3.1. For MOBs with fire departments the following applies:

A3.35.3.2. The number and type of fire apparatus for structural and aircraft rescue and fire fighting (ARFF) response will be determined IAW DODI 6055.6, *DOD Fire Protection Program*, AR 420-90, *Fire and Emergency Services*, and NFPA Codes.

A3.35.3.3. Fire and emergency services will be available 24 hours a day, seven days a week.

A3.35.3.4. Construction of one fire station per base camp is authorized to be built to house fire fighters and fire trucks, as recommended by the theater A7 and theater Fire Chief.

A3.35.3.5. Fire fighting facilities will be co-located and fire fighters should live at the fire station to reduce response time, if appropriate and determined by the theater A7.

A3.35.3.6. One classroom/library is required for firefighting training, fire prevention safety inspection training, and to maintain regulations, NFPA Codes, International Fire Service Training Association Training Materials, etc.

A3.35.3.7. Records holding area is required of training, inspections, and fire response activities.

A3.35.3.8. One fire control center per base camp is authorized.

A3.35.3.9. Fire Protection and fire prevention staffing will be in accordance with AR 420-90 and DODI 6055.6.

A3.35.3.10. For fire fighting purposes, base camps are authorized one 5,000-gallon tanker for water storage. The tanker will be capable of tapping into the potable water storage. Centrally located standpipes for filling the tankers should be added to the potable water system to fill the tanker. Manning of ARFF vehicles will be during airfield operational hours.

A3.35.3.11. Due to intrusion and security concerns, SCIF Facilities will use a battery operated fire alarm and detection system. Central reporting lines and radio transmitted alarms will not broadcast through the SCIF shielding and/or pose a threat for release of secure compartmental information.

A3.36. Utilities. Utility systems shall be designed based on current applicable military handbooks, technical manuals and guidance. Engineering calculations will be used to size the system. All utility designs will be approved by Deputy Chief of Staff for Engineering (DCSENG), United States Army, Europe (USAREUR) before construction begins.

A3.36.1. Electric Power. Where economically supportable and practicable, base camp power grids will be connected to commercial power. Smaller or remote base camps that cannot be economically connected to the commercial power grid are authorized to construct central power plants capable to support 125% of camp maximum demand load, or use distributed generators of sufficient capacity to support maximum demand loads. An economic analysis should be completed to determine the most cost effective power plant/generator solution. In all cases, critical facilities will be identified in the master plan by the mission support group commander and have back-up generator power. Non-critical facilities that have stand-alone distributed generators will not have any back-up generator power. A maximum of 10% of total generators (one minimum) serving non-critical facilities are authorized as reserve generators that can be placed in service quickly in case a generator serving a non-critical facility has a major failure.

A3.36.1.1. Determination of appropriate size for generators is not a simple task, as many generators are typically over-sized for loads served. Sizing of generators shall include an evaluation of actual and expected loads considering appropriate demand and load diversity factors, along with a review of any historical demand load data for similar base camps. Engine-generator sets may need de-rating to account for use of JP -8 fuel (rather than diesel), altitude, temperature and starting requirements for any large load specialized equipment (e.g., hospital X-ray machines). In many cases, load banks have been used to ensure adequate performance of under loaded engine-generator sets. Under loaded engine-generators may operate unsatisfactorily, fail prematurely, and require more maintenance and overhauls due to excessive formation of carbon deposits in the engine. The use of load banks and premature engine overhauls can be avoided if engine-generators are right-sized for the load. A complete and through analysis of the affected electrical system must be accomplished to ensure power plant requirements are properly defined. Leasing of generators for periods greater than six months is generally not cost effective.

A3.36.1.2. Where stand-alone distributed generators are the main power source, they will be sized so no generator set is loaded less than 50%.

A3.36.1.3. Electrical power systems for the MOBs and forward operating bases can be composed of sub-transmission lines to main substations; distribution lines to distribution substations; utilization lines to distribution transformers; and generators to provide emergency, stand-by and/or prime power for mission base camp facilities. Application of the new Distributed Generation (DG) Technology other than the matured Internal Combustion (IC) Genset (diesel engines) technology, maybe considered if economically feasible, environmental impacts and emissions are critical, and alternative fuels for DG applications are available. DG including IC Gensets allow cogeneration (combined heat and power). The waste heat from power generation may be recovered and used to offset costs. Today, the capital cost of an IC Genset is 200-350 $/Kilowatt (kW) rating for diesel and 400-1000 $/kW for natural gas. Operations and Maintenance (O&M) costs for both types excluding fuel are 0.01$/kWh/yr. Currently, DGs have high initial costs; however they are the future for power generation.

A3.36.1.4. At end state or earlier, electric power supply, transformers 400/208 volts 50 Hertz (Hz) and/or 230/120 volts 50 Hz should be used in lieu of 208/120 volt generators. 50 Hz to 60 Hz rotating or static (preferred) frequency converters should be used in lieu of 60 Hz generators. Applicable electrical industry codes, standards, or publications will apply to equipment, materials and construction covered in the Base Camp Facilities Standards. The minimum requirements of the latest version of NFPA-70, *National Electrical Code*, and American National Standards Institute C2, the National Electrical Safety Code, will be met and exceeded when requirements that are more stringent are specified and/or directed. These standards provide policy and guidance for main and forward base camp design criteria and standards for electrical power supply and distribution systems. Requirements of Military Handbook 1191, *Medical and Dental Treatment Facility Criteria,* and other medical facilities design office criteria will be considered for power arrangements for medical facilities.

A3.36.1.5. All facilities that are used for or contain housing, office space, or other areas that require the use of electric devices and/or equipment will be supplied with sufficient fixed electrical outlets. SEA huts used for housing will have eight fixed duplex electrical outlets. All facilities that require illumination to perform tasks or in order to provide a safe living, working, or recreational environment will be equipped with sufficient electric lights.

A3.36.2. Heating, Ventilation & Air Conditioning (HVAC). At a minimum, all facilities where personnel live, work or recreate will be provided heating. Install ECUs that provide heating and cooling capabilities whenever possible. Large facilities such as dining facilities and expeditionary hospitals should be provided with central HVAC systems. Camps will utilize installed central heating/cooling systems where already existing or as economically feasible. Storage areas will only be provided heating/cooling services as needed to address specific storage requirements of designated facilities types. When temporary and semi-permanent facilities such as SEA huts utilize ECUs, they will be sized to ensure delivery of heating/cooling as follows.

A3.36.2.1. The standard for maximum indoor temperature in winter is 68°F and minimum indoor temperature in summer is 78°F. Temperature strips are installed in administrative areas and living spaces wherever ECUs are utilized.

A3.36.2.2. Where central heating/cooling systems are pre-existing or have been installed for all other facilities (e.g. hangars, recreation centers, gyms, dining facilities, medical facilities, etc) the support staff will monitor installed thermostatic controls to maintain established temperature standards.

A3.37. Water. The order of preference for potable water at MOBs is:

A3.37.1. Joint Contracting Center (JCC) will contract to tie into local municipalities if it is economically feasible and meets Army health and force protection standards. The installation of a water purifying station, such as a UV-60, Transportable Water Purification and Disinfection System, should be considered in the start up cost.

A3.37.2. Installation of wells for potable water is authorized. Site planning should consider installing water storage distribution systems if economically feasible. A minimum of two wells per camp, one primary and one for back up are authorized. The expense of mobilization for drilling equipment represents a major cost of providing a well. Therefore, local contractors should be hired to perform well drilling. Additional wells may be drilled based on the capability of the first two wells to supply the required amount of water. Wells should be within camp boundaries.

A3.37.3. The least desirable option is trucking potable water and/or bottle water to the base camp. The cost of purchasing and maintaining the trucks, along with drivers and the reoccurring cost of bottle water to include purchase, transport, storage, and waste disposal needs should be included in the initial cost estimate.

A3.38. Wastewater Treatment Plant. The initial assessment for a base camp should have a design for the installation of a wastewater plant based on projected population size of the camp, to include Allied forces and local nationals. Coordination with JCC should be utilized to determine if connection to a municipal wastewater treatment plant is economically feasible and environmentally sound. Upgrades to existing sewage treatment plants are authorized to allow for effective treatment of waste being generated on that facility. Connection to local waste treatment facilities should be made only if the facilities meet Army standards. Upgrades will be limited to the expansion of the plant's current capabilities to handle the increased daily flows.

A3.39. Quality of Life (QOL) and Personnel Support. Personnel facility support for MOBs are intended to improve the QOL for assigned personnel. On MOBs where commanders have made the decision to split personnel support, MWR, AAFES services or concessions according to geographic location,

the sum of the space allocated for each activity split-based will not exceed the total square footage for that category of facility as determined below.

A3.40. Chapels. Each base camp is authorized a chapel ata rate 1,624 sq ft of space per 1,000 authorized user. The structure will have linoleum flooring installed. Design will be nondenominational. Office space will be provided for the execution of chaplain functions supporting privileged (e.g. confidential) communications with parishioners.

A3.41. Education Centers, Defense Logistics Agency (DLA), and Military Occupational Specialty (MOS) Library. A combination education center, DLA, and MOS Library of 1,710 sq ft is authorized for each 1,000 authorized user assigned to a MOB.

A3.42. Army and Air Force Exchange Services (AAFES).

A3.42.1. Barber/Beauty/Alteration/Pressing Facilities: A barber/beauty shop and alteration/ pressing facility is authorized for MOBs with a minimum operational duration of 6 months. Barber and beauty shops can be collocated in the sa me facility. Barber and beauty shops are authorized 240 net square feet (NSF) per 1,000 authorized users. Alteration and pressing facilities can be collocated in the same facility, if contractor requirements can be met. Alteration and pressing services are authorized 160 NSF per 1,000 authorized users.

A3.42.2. Field Exchange. All MOBs are authorized a field exchange with authorized space of 2,800 sq ft per 1,000 authorized users. Sufficient electrical connections are authorized to ensure sufficient, safe electrical power is available for displays and other requirements.

A3.42.3. Each field exchange warehouse is authorized 1,340 sq ft per 1,000 assigned personnel.

A3.42.4. Each field exchange is authorized 250 sq ft per 1,000 authorized users for administrative space.

A3.42.5. Loading docks and gravel parking lots for delivery trucks are authorized.

A3.42.6. Food and Service Concessions S tands. The commander will determine what food concessions will be on the post. Each f ood concession is authorized 480 sq ft per 750 authorized users. Authorized dining/seating space is 375 sq ft per 750 authorized users. One refrigerated cooler, three freezers, and one dry storage container are authorized per food court. When requested by the local Command, a specialty food concept is authorized 512 sq ft, which includes seating. Amusement areas adjacent to the food concession are authorized 150 sq ft per concession for equipment setup. The Army is responsible for providing basic facilities for these concessions, to include utility hookups and ventilation O&M. AAFES is responsible for the installation and maintenance of all AAFES peculiar items (e.g. cash registers, display shelves and coolers, stoves, and specialty lights).

A3.43. MWR.

A3.43.1. Fitness facilities. Each MOB is authorized a fitness facility at three sq ft per authorized user. The facility will have rubber floor tiles and male/female latrines.

A3.43.2. Multipurpose Facility. All MOBs are authorized a facility to conduct indoor sports, shows, or large meetings. The facility will have a wooden floor lined for basketball, volleyball, and other sports activities. If possible, the facility should be able to havean enclosed full size basketball court of 50’X 94’ with eighteen foot (18’) floor to ceiling clearance and a minimum five foot (5’) safety/walk-

ing lane surrounding the playing area. Field houses should have fluorescent lighting and climate control male/female latrines. The field house should have double entry/exit doors.

A3.43.3. Athletic Fields. Each MOB is authorized two sand volleyball courts, two horseshoe pits, a paved outdoor basketball (1/2 court) court and one outdoor pavilion. Base camps over 2,000 are authorized a second set.

A3.43.4. Where adequate space exists, multi-purpose athletic field with outdoor lighting suitable for flag football, softball, soccer, and track activities may be constructed.

A3.43.5. Running trail with workout stations: each MOB is authorized a lighted outdoor running trail up to two miles in length with up to eight uncovered fitness stations.

A3.43.6. Community Activity Center. Each MOB is authorized a community activity center. The center is authorized 2,400 sq ft per 1,000 assigned personnel. The facility should have double entry/exit doors, latrines, and running water. The community activity center and theater will be located in opposite areas of base for force protection issues. The structure will house the communication (cyber cafe) center with phone center, common area, library, equipment room, TV room, movie room, and video teleconference room.

A3.43.7. Multi-Purpose Theater. Each MOB with over 1,000 US personnel is authorized one multi-purpose theater, with a 35’ wide x 25’ deep stage, with steps on both sides and a securable storage area under the stage, two dressing rooms on both sides, with climate control, mirrors, and shelves to the sides. MOBs with fewer than 1,000 personnel are not authorized a stage. Facility will be hard wired with two each 380 volt, 32 amp and 64 amp, 220V power. The theater will be housed in a structure designed to seat 25% of the base population, or 500 persons, maximum. The theater should have double entry/exit doors. Seating will be folding metal or plastic chairs, that can be quickly removed and the floor space used for formations or transfer of authority movements.

A3.43.8. MWR Warehouse. Each task force is authorized one MWR warehouse facility at 1 sq ft per personnel supported. Facility is to be used for repair of MWR equipment and for short-term storage of remote site equipment and seasonal equipment not in use. It is not authorized for long-term storage of excess MWR equipment.

A3.43.9. American Forces Network (AFN) Services. Each MOB will establish facilities for broadcast transmission of AFN services. The standard AFN broadcasting pad is a minimum of 300’ X 150’ and located on the highest point of the perimeter or in the center of the base camp. It includes a housed power generation/fuel source. Variations for manned/unmanned operations areas as follows:

A3.43.9.1. Manned Operations. The AFN pad will include a facility to house a manned affiliate operation – consisting of studios, offices, and other administrative space up to a maximum of 56’ x 75’ or 4,200 sq ft.

A3.43.9.2. Unmanned Operations. One climate-controlled equipment shelter the size of a standard SEA hut (512 sq ft) is required.

Attachment 4

FORWARD OPERATING BASE AUTHORIZED FACILITY/CONSTRUCTION STANDARDS

A4.1. Forward Operating Bases. A forward operating base (FOB) is defined as a site normally occupied by company-sized units and operated on a continuous basis. The standards found in the main body of this volume apply to FOBs, except in the following circumstances.

A4.2. Roads. FOBs are authorized gravel on primary and secondary roads.

A4.3. Dining Facilities. Dining facilities are authorized 1,024 sq ft of dining room space and 512 sq ft for kitchen, admin and storage space per 100 authorized users. Adequate space for cleaning, latrine, and clothes changing for local national kitchen staff will be provided. Loading dock, if present, can be concrete, asphalt, or treated lumber.

A4.4. Laundry Collection/Distribution Point. A total of 256 sq ft is authorized for a laundry collection/distribution point.

A4.5. Aviation Facilities. Helicopter landing and parking pads will be concrete. Bean Bag Lighting Kit will be available and operational for nighttime flight operations.

A4.6. Communications Compound/Network Control Center. Each FOB is authorized 512 sq ft to house the base's communications control operations.

A4.7. Aid Stations. Aid stations are authorized a maximum of 512 sq ft.

A4.8. Transportation Squadron Maintenance Facilities. A maintenance facility of 1,200 sq ft erected on concrete or asphalt pads are authorized for each company-sized element. The maintenance facility will be equipped to provide heating, electric lights and compressed air.

A4.9. Maintenance Administration. A maximum of 320 sq ft for office space is authorized for each company-sized element.

A4.10. Fire Protection. Portable fire extinguishers will be available in all buildings and places where flammable materials are used. The AOR Fire Chief, in coordination with the DPW, will determine the number of fire extinguishers for each facility. The FOB Commander will ensure the occupants are properly trained in their use.

A4.11. EMEDS. Expeditionary medical facilities expand depending on the size of the population served. For instance, EMEDS+25 package which serves a population of 3,000 to 5,000 personnel will require 40,000 sq ft of land area, 200kW of power, 1,430 gallons of potable water per day, 300 gallons of diesel fuel per day, 2,500 gallons of grey water runoff, and 1,100 pounds of solid waste removal per day. See AFPAM 10-219, Volume 5 for additional information on the beddown of EMEDS and theater hospitals.

A4.12. Utilities.

A4.12.1. Water. Reference water guidelines located in the Utilities Section of MOB standards.

A4.12.2. Electric Power: Generator power will continue to be the primary source of remote site power if commercial power is not available.

A4.12.3. Sewage collection tanks are authorized. However the initial assessment for a FOB should consider installation of a wastewater treatment system. Sewage can be trucked to a suitable wastewater treatment plant.

A4.13. MWR and Personnel Support.

A4.13.1. Community Activity/Education Center. Each FOB is authorized a community activity/education center at a rate of 1,024 sq ft per 150 authorized user, with a minimum size of 1,024 sq ft.

A4.13.2. Fitness center is authorized at a rate of 1,024 sq ft per 150 authorized users with a minimum size of 1,024 sq ft.

A4.13.3. Barber/Beauty Shop: A barber/beauty shop is authorized for FOBs. Barber and beauty shops can be collocated in the same facility. Barber and beauty shops are authorized 256 sq ft per 150 authorized users with a minimum size of 256 sq ft.

A4.13.4. Base Exchange. All FOBs are authorized a Field Exchange with authorized space of 512 sq ft per 150 authorized users with a minimum size of 512 sq ft. Sufficient electrical connections are authorized to ensure sufficient, safe electrical power is available for displays and other requirements.

A4.13.5. Athletic Fields. Each FOB is authorized one sand volley ball court, one horseshoe pit, a paved outdoor basketball (1/2 court) court, and one outdoor pavilion. Where adequate space exists, multi-purpose athletic field suitable for flag football, softball, soccer, and track activities may be constructed.

A4.13.6. Running Trail. Each FOB is authorized a running trail.

A4.14. Non-Authorized Facilities. The following facilities are **not** authorized at a FOB.

A4.14.1. Individual Equipment Unit Warehouse.

A4.14.2. Hazardous Materials Warehouse.

A4.14.3. Morgue.

A4.14.4. DRMO.

A4.14.5. Ammo Supply Point.

A4.14.6. Wash Rack.

A4.14.7. Training Facilities.

A4.14.8. Security Forces Law Enforcement Station (force protection and entry control points are authorized as required).

A4.14.9. Alteration/Pressing Shop.

A4.14.10. Multi-Purpose Theater.

A4.14.11. MWR Warehouse/Maintenance Facility.

A4.14.12. AFN Manned Operations.

Attachment 5

FORWARD OPERATING LOCATION AUTHORIZED FACILITY STANDARDS

A5.1. Forward Operating Locations (FOLs). FOLs are normally used for short term, operationally defined missions (e.g. checkpoints and observation posts) for platoon or squad sized elements and will not have the level of services the main operating airbases and forward operating airbases are authorized. FOLs will be authorized the following primary services.

A5.1.1. Field expedient slit trenches/urine pipes, portable latrines, existing host nation facilities or ablution units if they can be serviced. BEAR or Force Provider latrine, shower and shave units are preferred over expedient method shower and latrine facilities, if the site will be occupied over the winter or through periods of extreme inclement weather (such as monsoon season, etc).

A5.1.2. Portable generators or taps into host nation facilities to provide power.

A5.1.3. Heated Tier II tents (16' x 32') for living and working space, or modular style containers (8' x 20'). If containers are used, one container for admin space is authorized. Living space is the same as base camps.

A5.1.4. One Tier II tent to serve as a recreation room and break room. Modulars are not authorized for this purpose at FOLs.

A5.1.5. One Tier II tent for a fitness facility. Modulars are not authorized for this purpose at FOLs.

A5.1.6. Airmen personnel support will be accomplished by in-theater higher headquarters, located at either an FOA or MOA. No facilities are authorized.

A5.1.7. Construct the perimeter fence with concertina wire and other approved force protection materials.

A5.1.8. Preferred blast protection is HESCO-style expedient blast barriers (interlocking wall 10' high and/or berms).

A5.1.9. Gravel parking and walking paths should be constructed from well-graded gravel and compacted. These areas should be free of loose rocks greater than 40 mm in diameter to decrease probable damage to vehicles and personnel injury.

A5.1.10. EMEDS package supporting up to 500 personnel. This package requires 15,000 sq ft of land area, 65kW of power, 400 gallons of potable water per day, 700 gallons of grey water runoff, and 180 pounds of solid waste removal per day. See AFPAM 10-219, Volume 5 for additional information on EMEDS beddown.

A5.2. Additional FOL References. See **Attachment 1** for other references related to FOLs.