



MINISTRY OF DEFENCE

Joint Tactics, Techniques and Procedures 4-05

Operational Infrastructure

Second Edition



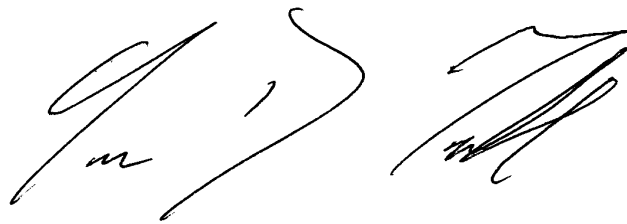
Development, Concepts and Doctrine Centre

JOINT TACTICS, TECHNIQUES AND PROCEDURES 4-05

(2nd Edition)

OPERATIONAL INFRASTRUCTURE

Joint Tactics, Techniques and Procedures 4-05 (JTTP 4-05) (2nd Edition),
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Head of Doctrine, Air and Space (Developments, Concepts and Doctrine)

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Amendment no.	Date of amendment	Initials

Preface

1. This JTTP was first published in 2001. Unfortunately, none of the planned supporting sub-documents were published. Since then, cumulative experience on campaigns in Iraq, Afghanistan and elsewhere have fostered a considerably more detailed and sophisticated understanding of how best to develop the operational estate in support of a military campaign.

Purpose

2. The purpose of this JTTP is to set out the doctrine and procedures required for the effective development of the operational estate. It is a book written by practitioners for practitioners.

Scope

3. This JTTP focuses on the use of infrastructure to support a deployed Force. Though referred to in this document, Infrastructure support to Stabilisation is covered in greater depth in JDP 3-40 *Security and Stabilisation: The Military Contribution*. Battlefield infrastructure is included as it forms part of the overall operational estate. However, the requirement for it and how it is delivered are covered in more detail in other publications.¹

Target audience

4. This publication is aimed at providing the guidance required by personnel responsible for:

- a. The planning of infrastructure support to operations.
- b. The delivery of infrastructure support in theatre.

Structure

5. The main text of the JTTP is broken down into four parts.

¹ Such as *Military Engineering Volume XXI, Military Engineer Support in the Land Environment*.

- a. **Part 1 – Planning the operational estate.** The first part concentrates on the constituent parts of the operational estate and how they are developed and managed in a coherent manner in order to support a military operation.
- b. **Part 2 – Delivery of infrastructure support.** The second part details how infrastructure support is delivered. It explains how contracting is undertaken to minimise the need for military manpower and how to act as an intelligent customer when deployed.
- c. **Part 3 – Safety and environmental issues.** The MOD has well-developed safety and environmental procedures. Part 3 explains how, on a military operation, those procedures are applied. It gives guidance to field commanders and, in a sense, acts as an approved code of practice.
- d. **Part 4 – Funding infrastructure.** The final part explains how the operational estate is funded and what must be done to obtain the financial resources it requires.

Subordinate publications

6. There are three subordinate publications to the main JTTP. They each address more specialised aspects on infrastructure support.
 - a. **JTTP 4-05.1 *Compendium of Equipment Infrastructure*.** The first subordinate document is a list of items of equipment infrastructure. It concentrates on giving the details required by those who plan and develop the operational estate. It is of particular use in the support of tactical bases.
 - b. **JTTP 4-05.2 *Lands and Environmental Procedures*.** This document gives the detailed procedures and proformae for lands and environment management.
 - c. **JTTP 4-05.3 *Infrastructure Project Management*.** This is a comprehensive guide to project management of infrastructure projects.

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Chapter 1 – Infrastructure on operations

Section 1 – Introduction

101. **Infrastructure, a line of development and a capability.** Operations in the land environment use a wide range of military capabilities to achieve mission success. These capabilities are often highly dependent on infrastructure to achieve and maintain operational effectiveness. The longer an operation is required to endure, the greater the dependency on infrastructure. Hospitals demand an increasingly complex suite of facilities, weapon systems often need environmentally controlled storage to prolong ammunition stock-life, ships need extensive facilities to off-load personnel and materiel, and Unmanned Aerial Vehicles (UAVs) require operating surfaces and facilities of, arguably, a higher standard than that of combat aircraft.

Insight 1-1: Operational infrastructure is a line of development in almost all of the military capabilities required on an operation. The ability to deliver and maintain this infrastructure in the operational environment is, however, also a capability in its own right.

102. **Infrastructure and logistics.** Operational infrastructure supports and maintains the deployed force. It is therefore a component of logistics and is managed as a J4 function.

103. **Stabilisation.** Stabilisation is now a permanent component of the operational environment. Not only does the deployed force retain an operational infrastructure capability to develop and sustain military capability, it also leverages this capability to assist in stabilisation through the restoration of essential services and, when called upon, through the planning and facilitation of reconstruction and development. The UK Armed Force's operational infrastructure capability therefore supports Military Assistance to Stabilisation and Development (MASD). This document, however, focuses on the use of operational infrastructure in direct support to the deployed force.

104. **Land environment.** Operational infrastructure exists in the land environment (including littoral and airside). This publication addresses the provision of infrastructure support for all force components that require it within a joint operations area (JOA). The temporary support (power and drinking water) from a ship to the land in, for example, disaster relief, whilst useful, is not considered 'operational infrastructure' and so falls outside of the scope of this publication. The provision of infrastructure at a port, however, *is* considered to be operational infrastructure and is considered here.

MOD governance of operational infrastructure capability

105. There is no single MOD-level organisation responsible for operational infrastructure capability. However, the key organisations are:

106. **Capability (Expeditionary Logistic Support).** Capability (Expeditionary Logistic Support) (Cap (ELS)) is the capability sponsor for most, though not all, equipment infrastructure.¹ Cap (ELS) runs a capability planning group and programme board that plans and delivers equipment infrastructure. Cap (ELS) is also the cross-capability champion for the integration of equipment intended for use in a tactical base.

107. **Defence Equipment and Support.** The General Support Group within Defence Equipment and Support (DE&S), procures and supports most equipment infrastructure. DE&S' Engineer Resources Management Cell (ERMC) is a part of the Joint Support Chain (JSC) and is often used to procure some specialist materiel for construction. The Equipment Managers and Integrated Project Team Leaders (IPTL) provide invaluable assistance and advice to those responsible for developing the operational estate.

108. **Defence Infrastructure Organisation.** Although it is not responsible for the operational estate, the Defence Infrastructure Organisation (DIO) provides specialist advice and contract/commercial support. DIO's support is provided through reachback to the UK; however, it may deploy personnel into a joint operations area for limited periods in order to undertake some specific task. DIO also sponsors key references upon which much of the governance

¹ Bridging is the most notable exception. This is sponsored by Capability (Ground Manoeuvre) (Cap (GM)).

of the operational estate is based.² DIO has the following roles on the operational estate:

a. **Commercial support.** The commercial licences exercised by military Works Contract Officers and the simplified contracts³ they use are issued by DIO. DIO commercial staff also mentor those to whom these licences have been granted. In addition, some of DIO's commercial staff may deploy to provide commercial support. High-value, novel, or potentially contentious infrastructure contracts are drawn-up by DIO.

b. **Technical support.** Specialists from within DIO also provide support and advice in areas such as:

- (1) Safety Rules and Procedures (SRPs).
- (2) The selection and employment of specialist contractors.
- (3) Audits and project evaluations.
- (4) Acquiring rights to occupy publicly and privately owned sites.
- (5) Lease management.
- (6) Lettings.
- (7) On-site disposal, including liabilities for repair, remediation and reinstatement.
- (8) Preparation of a Memorandum of Understanding (MOU) or Technical Agreement (TA).
- (9) Environmental policy.

² Such as JSP 375 *MOD Health and Safety Handbook*, JSP 434 *Defence Construction in the Built Environment*, JSP 435 *Defence Estate Management*.

³ These contracts are published in the Deployable works commercial toolkit.

109. **ACDS (Log Ops).** ACDS (Log Ops) – (Strategy and Policy) sets the policy for Contractors on deployed operations (CONDO).⁴ Within ACDS (Log Ops), Def Log Pol is the Sponsoring Authority for all joint logistics doctrine including operational infrastructure.

110. **HQ Engineer in Chief (Army).** As explained in Part 2, Royal Engineer units support all three services when deployed. HQ Engineer-in-Chief (Army) (HQ EinC(A)):

- a. develops the overall operational infrastructure capability;
- b. authors doctrine (including this publication);
- c. conducts level one integration of equipment infrastructure across all the Defence Lines of Development (DLOD); and
- d. provides support to theatre outside the normal chain of command, for example, Competent Army Authority and Inspectorate (CAA&I) advice and the production of post-project evaluation reports.

Section 2 – Definitions

111. **Infrastructure.** Infrastructure can be defined as the basic physical structures (for example, buildings, roads, power supplies) needed for the operation of a society or enterprise.⁵ It should be noted that the term *utilities* is a sub-set of infrastructure. The NATO definition of infrastructure is: *in NATO, the static buildings, facilities and other permanent installations required to support military capabilities.*⁶ **Unfortunately, as explained later, the NATO definition is too limited in its scope for use in an operational environment and so is not used.**

112. **Indigenous infrastructure.** Indigenous infrastructure is the infrastructure within the joint area of operations (hostile and/or host nation) that has been provided for the use of the local population.

⁴ JSP 567 *Contractor Support to Operations (CSO)*, 5th Edition, 2009.

⁵ *Concise Oxford English Dictionary*

⁶ NATO Allied Administrative Publication (AAP)-6 *NATO Glossary of Terms and Definitions* (2012).

113. **Operational infrastructure.** Operational infrastructure is defined as the basic physical structures (for example, buildings, roads, power supplies) within the joint operations area upon which the UK Armed Forces rely on for the prosecution of its mission through the sustainment and exercise of deployed military capability. It may include some local, indigenous infrastructure such as a Sea Port of Debarkation (SPOD). However, it is highly likely that additional infrastructure will be required. This additional infrastructure is referred to as *expeditionary*. It is likely to include both equipment infrastructure and infrastructure that has been constructed in-situ. This is shown in Figure 1.1.

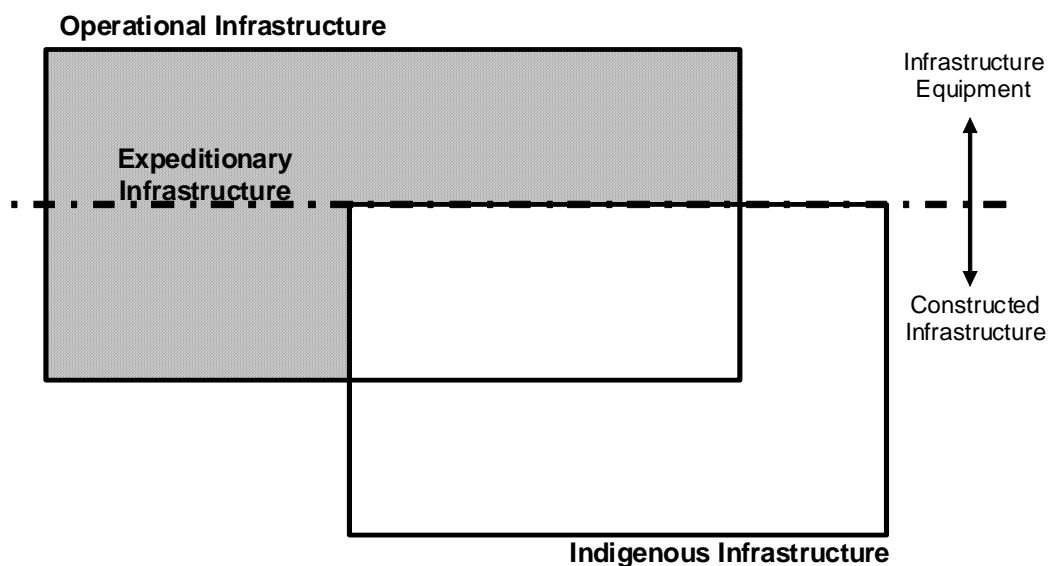


Figure 1.1 – Operational infrastructure

114. **The operational estate.** The operational estate is that operational infrastructure for which a UK force is responsible for providing and supporting. This includes infrastructure that the UK has agreed to provide for any coalition partner under Collective Responsibility (CR)⁷ or similar arrangements. Some indigenous infrastructure may also be considered to be operational infrastructure. This is shown in Figure 1.2. The deployed force is therefore required to develop and maintain this operational estate, not merely its expeditionary equipment infrastructure component.

⁷ Allied Joint Publication (AJP) 4-00 *Logistics*, December 2003.

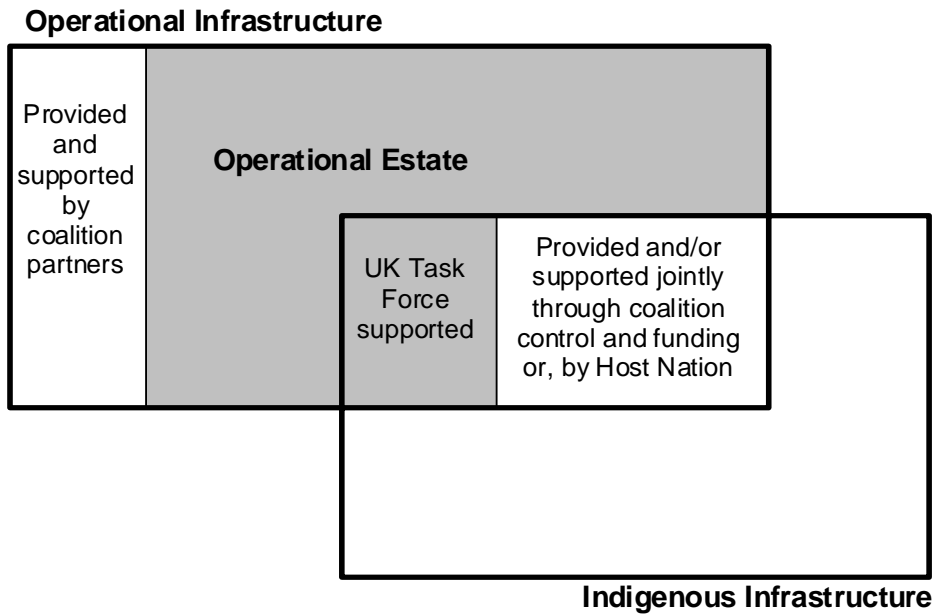


Figure 1.2 – The operational estate

115. **Non-operational infrastructure.** Some indigenous infrastructure may have strategic importance for the operation, for example, the national oil production network. It may therefore be referred to as *critical infrastructure*; however, it may not be required to support service personnel. During Stabilisation Operations, it is within the indigenous infrastructure that reconstruction and development takes place. Some infrastructure provided through reconstruction projects may have an additional, secondary benefit to the UK Armed Forces, such as improved bridges along a Main Supply Route (MSR). However, only when the primary purpose is the support of the UK Armed Forces is it considered to be operational infrastructure. This distinction has particularly significant implications for funding.

116. **Infrastructure’s functional categories.** Infrastructure in general may be thought of as being comprised of three broad, overlapping functional categories:

- a. **Entry points and lines-of-communication.** Air Ports of Debarkation (APOD), Sea Ports of Debarkation (SPOD) and land-border crossing points provide the means of entry into the joint operations area. Road, rail and waterways are the lines-of-communication within it. This type of infrastructure, whilst often integrated with utilities such as power and water, can often be made to

function without it. It is usually provided through what is considered to be civil engineering.

b. **Facilities.** Hospitals, stores, camps and headquarters are examples of facilities that require both physical structures and a supply of utilities (such as power, water and fuel) in order to function. Their operation may be severely compromised without these utilities.

c. **Utilities.** Electrical power generators and their distribution networks,⁸ water treatment works and sewerage systems are examples of infrastructure, the primary function of which is the provision, processing and storage of a utility 'commodity' (for example, power, water and fuel).

117. **Operational environment.** The operational estate comprises a considerable number of different items of infrastructure, all within the broad functional categories described above. Their form, however, is not only determined by their function but also by the operational environment in which they exist. Some examples are shown in Figure 1.3.

a. **Battlefield infrastructure.** Battlefield infrastructure is that which is required for the direct support of combat. Over time, the requirement for battlefield infrastructure at any particular location may arise, disappear and re-appear. This infrastructure is therefore characterised as being quick to establish and remove. Similarly, the risk/benefit balance of these structures is heavily influenced by their comparatively short design life. Therefore their prolonged use is unlikely to be appropriate.

b. **Campaign infrastructure.** Campaign infrastructure is the term used to describe all other infrastructure required in the operational estate. The demarcation between battlefield and campaign infrastructure is not a clear boundary.

⁸ The term *utilities* as used here does not cover platform power or power storage through batteries used in equipment.

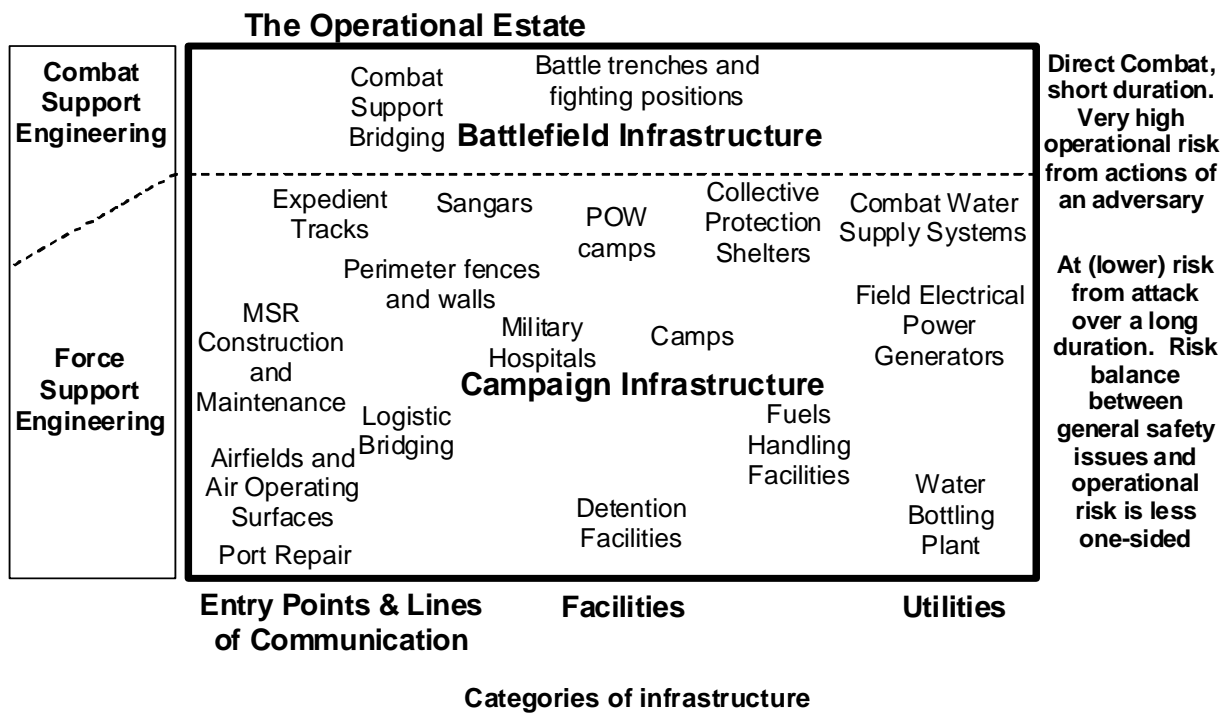


Figure 1.3 – Battlefield and campaign infrastructure

118. **Infrastructure and engineering.** As shown in Figure 1.3, infrastructure is built and sustained through engineering. Engineering is therefore a key enabler. The management of the operational estate cannot be undertaken without consideration of the service personnel’s ability to carry out engineering when deployed.

a. **Combat support engineering.**⁹ Direct support to current or imminent operations is called Combat Support Engineering. It is conducted with an emphasis on speed of operation to fulfil a short-term tactical requirement. Whilst its focus is on battlefield infrastructure, the skills and overall capability can be applied to some elements of campaign infrastructure.

b. **Force support engineering.** Force support engineering is the deliberate, longer-term work to sustain the UK Armed Forces, prepare for future operations and to prosecute the mission.

⁹ The definitions given here for Combat and Force Support Engineering are based on those in ATP-52(B) NATO *Land Force Military Engineer Doctrine*.

119. **Equipment and construction.** In almost all cases, the joint operations area will have some form of indigenous infrastructure. A deployed force must be able to adapt it for its use. However, it is most unlikely that this will be sufficient. It is almost always augmented with *expeditionary infrastructure*; this may be equipment- or construction-based, whichever is more appropriate. For any specific requirement there is usually at least one equipment and one construction option. Table 1.1 outlines their comparative characteristics and Figure 1.4 shows how they relate to the operational estate.

Ser	Equipment	Construction
(a)	(b)	(c)
1	Capability based around tangible assets (for example, tented camps, equipment bridges).	Capability based around engineering skills (for example, contract management, bridge assessment).
2	Is quantifiable and so is a readily measurable element of capability.	Is not readily quantifiable and, therefore, much harder to measure.
3	Funded by Equipment Programme (EP). ¹⁰	Funded through Non-Attributable Military Cost of Operations (NACMO).
4	No fixed, specific location, redeployable within theatre and to other theatres.	Materiel incorporated permanently at a specific place, not redeployable and often obtained locally.
5	Design and safety case built around the above assumption.	Safety Rules and Procedures (SRPs) based on assumption of fixed location and longer-term operation.
6	Optimised for an early start-up, can be inefficient if operated over a protracted period.	Over time, usually gives better value for money and lower logistic burden.

Table 1.1 – Characteristics of equipment and construction

¹⁰ May be augmented though Urgent Operational Requirements (UORs) purchased through the NACMO process.

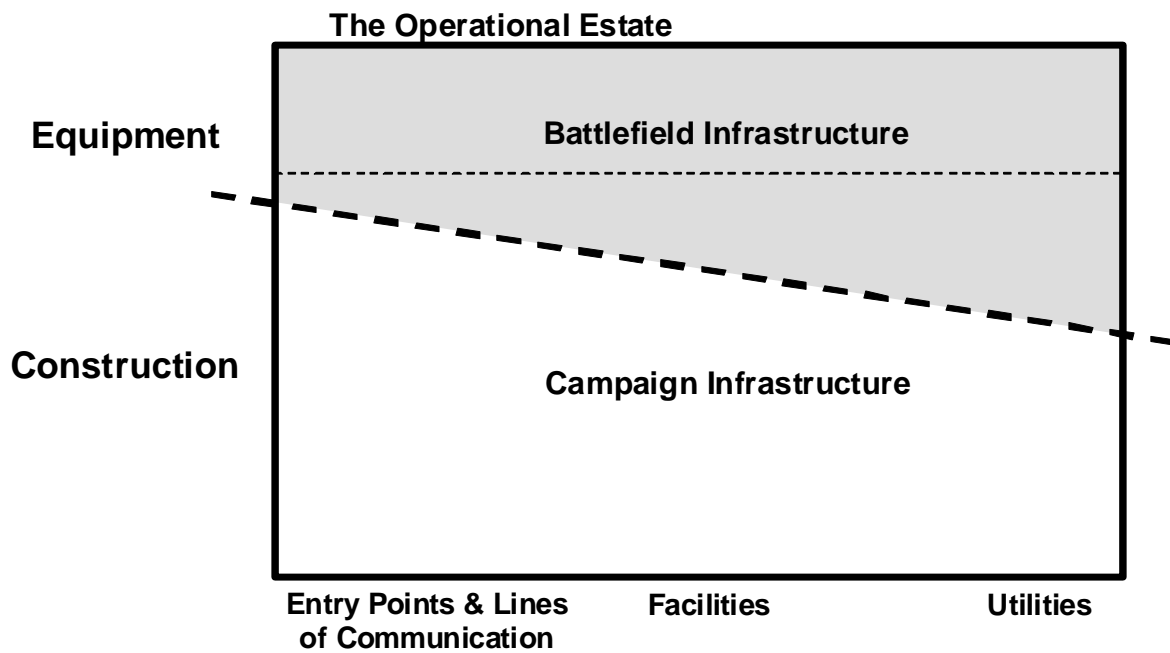


Figure 1.4 – Both equipment and construction solutions can be found

120. **Taxonomy.** An equipment taxonomy is provided at Annex 1A. However, it must be recognised that infrastructure components can have many different uses, for example, trackway may be used for vehicles or as aircraft operating surfaces.

121. **Hybrid infrastructure solutions.** The solutions that the UK Armed Forces use are likely therefore to be a hybrid of indigenous, constructed and equipment infrastructure. The guiding principle will be the selection of the most appropriate solution. What constitutes an *appropriate solution* is likely to change as the campaign evolves.

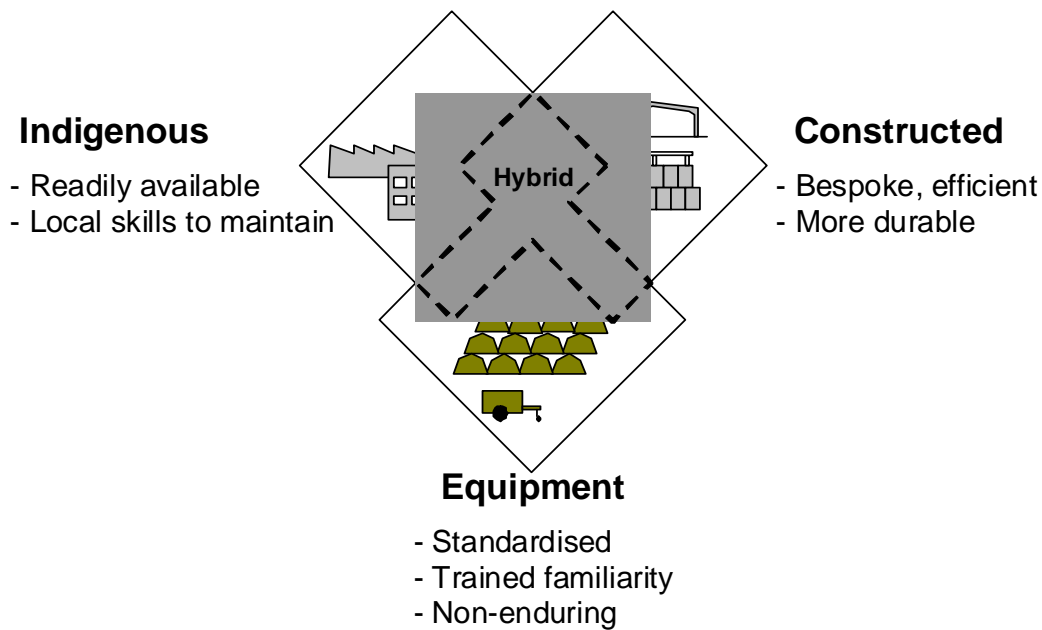
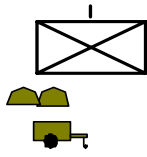


Figure 1.5 – Indigenous, constructed and equipment infrastructure hybrids

122. **Determining what constitutes the operational estate.** The operational estate may therefore include mobile equipment infrastructure (for example, towed generators). If used for a prolonged period, this equipment is most appropriately managed as *infrastructure* along with the other elements of the site-specific, hybrid solution.¹¹ This same mobile equipment may, however, be used in a mobile, manoeuvre role. If mobile and not tied to a site, it is appropriate that the owning unit manages the equipment in the same way that it manages its other items of equipment. It is therefore not practical to define the operational estate purely in terms of the types of components. If a unit is momentarily no longer mobile but still manoeuvring, it can be considered to be *camping-with-equipment*. Once the operational campaign requires a more protracted, *static*, presence at that specific location, the location itself becomes formally recognised as a 'base' and is established as a part of the operational estate. Its development is then planned accordingly. The items of equipment at that location are managed as infrastructure forming part of what may be a hybrid solution. This is shown in Figure 1.6, and is explained in more detail in Chapter 2.

¹¹ For this reason the use of the NATO definition of infrastructure is clearly not appropriate on the operational estate.

Units Camping-with-equipment

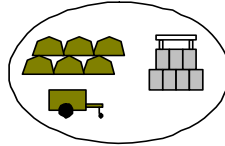


- Simple requirement
- No development plan needed
- Equipment Support (ES)
- Equipment Safety Case
- Just equipment

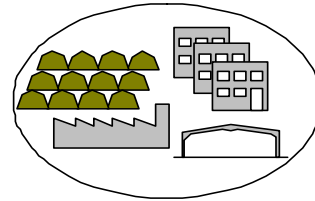
Manoeuvring

The Operational Estate

Tactical Bases



Main Bases



- Complex requirement
- Infrastructure Development Plan
- Facilities Management (FM)
- Safety Rules & Procedures
- Hybrid infrastructure solutions

Static

Figure 1.6 – Camping-with-equipment, or a base within the operational estate?

Insight 1-2: The deployed force must exercise careful control over equipment that may be used both as part of the operational estate and to support units that are merely *camping-with-equipment*.

Section 3 – Operational context

123. **Desired operational effect.** The primary desired operational effect is the support and sustainment of the deployed force in order to maintain operational effectiveness. This can be described as a ‘J4’ function. The UK Armed Force’s operational infrastructure capability *may* also be used to perform a ‘J3’ function by assisting stabilisation through the restoration of essential services and, when required, through the planning and facilitation of reconstruction and development of the indigenous infrastructure. This function makes use of the engineering skills of personnel and the UK Armed Force’s infrastructure procurement mechanisms, rather than physical equipment or other tangible assets. This is shown in Figure 1.7.

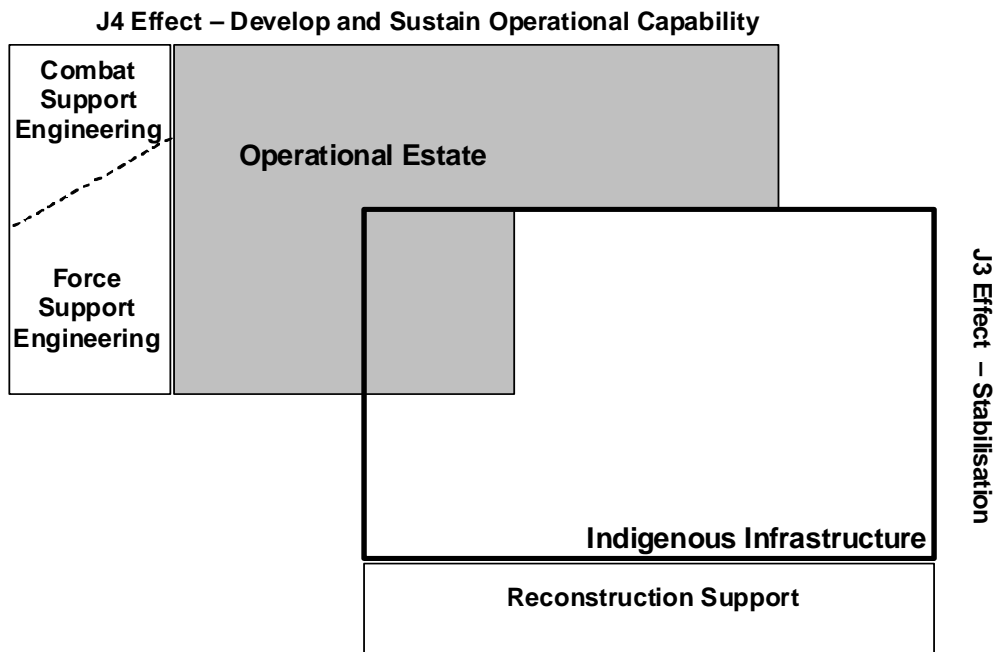


Figure 1.7 – Desired operational effects

124. **J4 effect – Develop and sustain operational capability.** A deployed force needs infrastructure to achieve its optimum operational effectiveness, for example, the most capable Unmanned Aerial Vehicles (UAVs) cannot be launched by hand; they need large aircraft operating surfaces. Operational infrastructure may be used in manoeuvre support across the spectrum of conflict in the operating environment. Infrastructure is even more critical to the sustainment of a deployed force. To achieve J4 effect, the requirement is for tangible structures or a specified level of support performance. Exactly what those structures are, how that support is given, or, indeed, who conducts the work is of secondary importance.

125. **J3 effect – Stabilisation.** Stabilisation comes not simply by creating infrastructure, but by demonstrating to the local populace that they will have a better future by complying with the rule of law and supporting their elected government. Where integrated into an overall series of development themes, involvement in infrastructure projects generates local wealth, builds economic capacity and helps improve the skills of local people. Presentational issues are central to the planning of reconstruction. Therefore, not only is the item of infrastructure itself important, but so is the way in which it is procured and supported.

126. **Tensions between J3 and J4 effect.** The different outcomes required by these two different effects can lead to dynamic tension on operations. For example, using local building techniques and local tradesmen to build our operational infrastructure to local standards may help in stabilisation but may not be the best way to develop and sustain the operational estate. Whether and to what degree we can compromise time, cost and quality will be an operational decision – probably taken on a case-by-case basis. The Permanent Joint Headquarters (PJHQ) will set the principles for theatre to exploit/safeguard and establish a balance.

127. **Live, move and fight.** Although operational infrastructure is seen as a J4 Logistic function, it is inextricably linked to other, J3 Operational functions. Overall it is best to consider operational infrastructure as an overlapping framework that enables the deployed force to live, move and fight. This is shown in Figure 1.8.

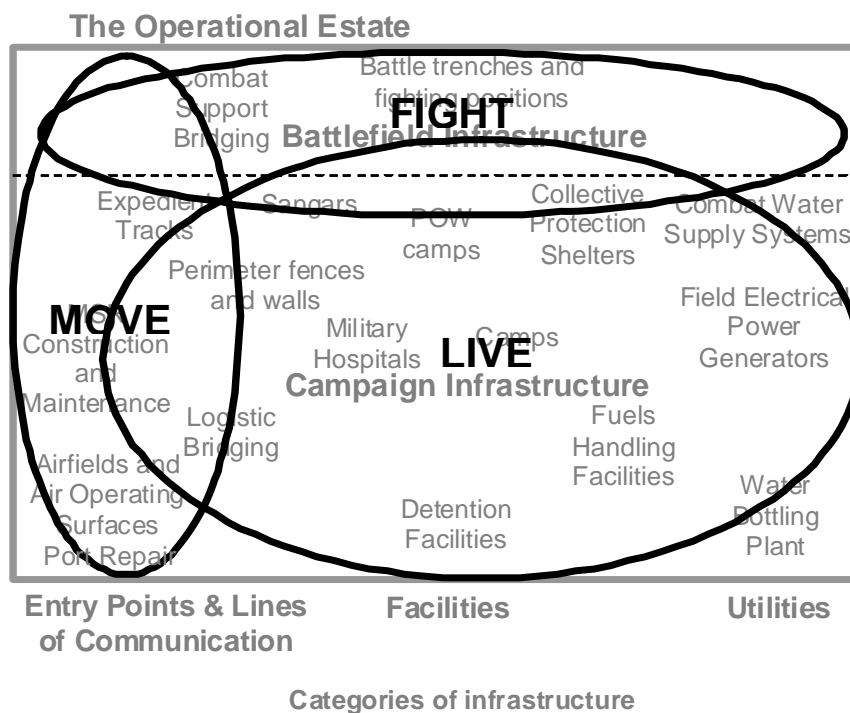


Figure 1.8 – Operational Infrastructure enables service personnel to live, move and fight

Annex 1A – Equipment capability taxonomy

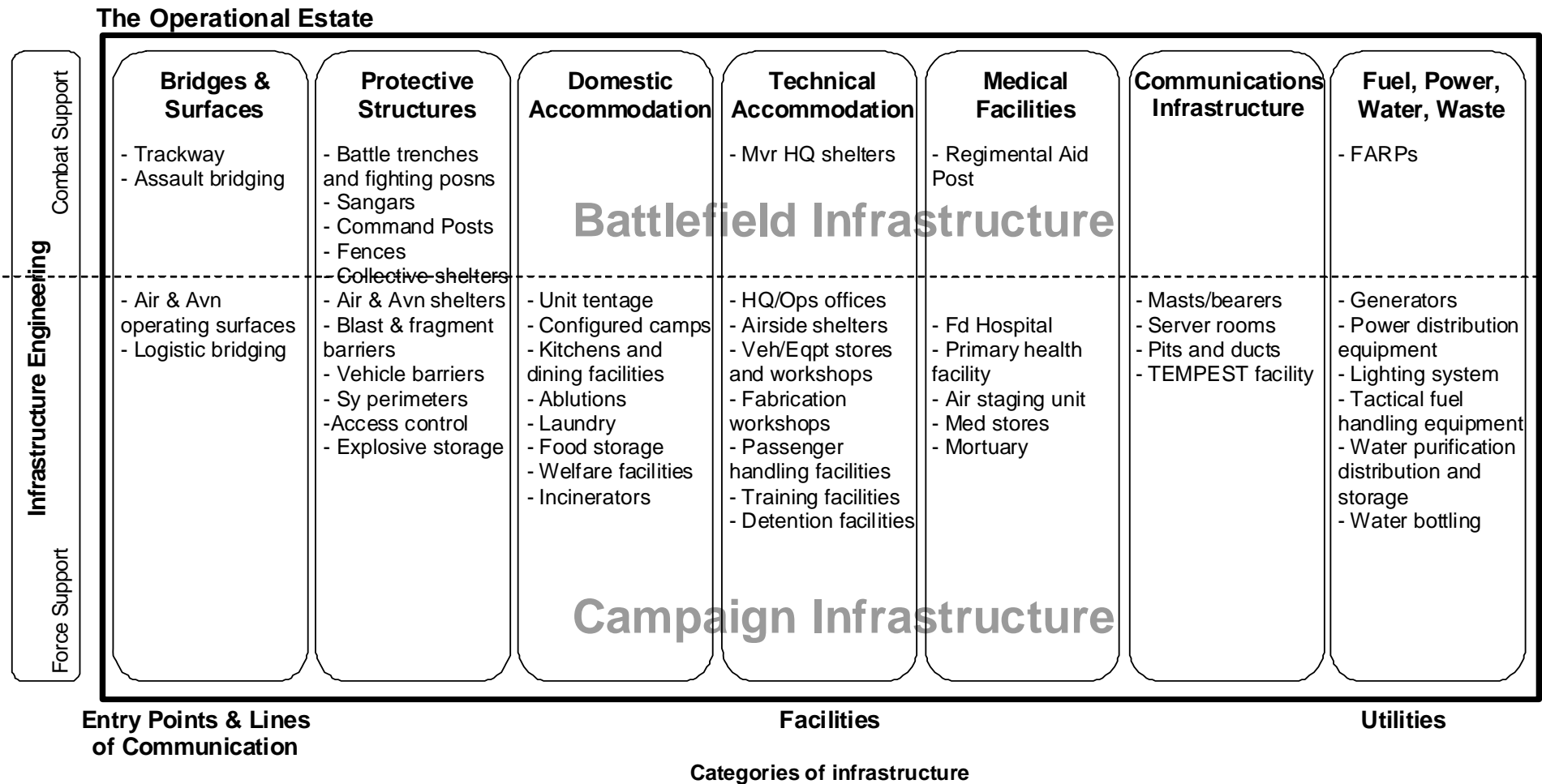


Figure 1A.1 – Components of infrastructure across their functional categories

1A1. **Bridging and operating surfaces.** The ability to assess, construct, maintain and repair:

- a. Operating surfaces (domestic trackway, hardstanding for storage/repair, air, aviation and Unmanned Aerial Vehicles (UAV) operating surfaces).
- b. Gap-crossing equipment (bridges, ferries and associated trackway).

1A2. **Protective structures.** The ability to assess, construct, maintain and repair physical protective structures and base security either as standalone elements or as integrated components of other Operational Infrastructure (Op Infra) elements, for example, retrofit materials, sangars, shelters, walls, fences and entry control equipment. This includes battlefield infrastructure items, such as fighting positions, but excludes security surveillance equipment.

1A3. **Domestic accommodation.** The ability to deploy, construct, maintain and repair domestic accommodation equipment (Tier 1 and some specialist Tier 2 items), both intended for unit-organic and centralised use, for example, tentage and camp facilities, such as laundry, ablutions, kitchens and waste incinerators. This includes utilities, such as power generation, that are integral to these facilities.

1A4. **Technical accommodation.** The ability to deploy, construct, maintain and repair technical accommodation equipment (Tier 1 and some specialist Tier 2 items) that enables command and control, Equipment Support (ES) (inspection and maintenance), materiel storage and processing, and other specialist functions. This includes, for example, mobile headquarters, offices, workshops, aircraft shelters, detention facilities and passenger handling facilities.

1A5. **Medical facilities.** The ability to deploy, construct, maintain and repair medical facilities such as field hospitals, aeromed facilities and mortuaries, primary health care and field surgical facilities.

1A6. Communications and intelligence, surveillance, target acquisition and reconnaissance infrastructure. The ability to deploy, construct, maintain and repair masts, TEMPEST facilities and other physical infrastructure required to facilitate intelligence, surveillance, target acquisition and reconnaissance (ISTAR), communications and Communication and Information Systems (CIS).

1A7. Power, water, fuel and waste. The ability to deploy, construct, maintain and repair infrastructure equipment the primary function of which is the generation, storage, processing and distribution of utilities; for example, towed generators, power distribution systems, water treatment and storage, bottling plant, fuel handling and lighting trailers. This includes all items that are not integral and embedded within a domestic or technical facility.

1A8. Infrastructure engineering. The ability to deploy, construct, maintain and repair infrastructure through engineering. This includes the equipment needed to support construction such as field survey equipment. However, Infrastructure Engineering Capability is far more than the sum of equipment used and facilities constructed. It includes the people, training, organisation and non-equipment tools (such as contracts) that must be managed in order to support the whole capability.

Chapter 2 – Governance and planning of the operational estate

Section 1 – Governance

201. **Permanent Joint Headquarters and overall responsibility for the operational estate.** Chief of the Joint Staff (CJO) is responsible for the operational estate. Permanent Joint Headquarters (PJHQ) exercises overall control of the operational estate through its J1/J4 branch and funding is arranged through its J8 branch. In Theatre this control is exercised through a National Support Element¹ or any other designated headquarters responsible for the sustainment of the UK Armed Forces.

202. **NATO and coalition operations.** NATO has established the principle of *Collective Responsibility* (CR) of nations and NATO authorities for logistic support to its multinational operations. In any multinational operation, each nation bears ultimate responsibility for ensuring the provision of support for its own forces. Either individually, or by cooperative arrangements, nations must therefore ensure the provision of logistic resources to support their forces allocated to NATO. As explained earlier, the operational estate is that operational infrastructure for which the UK is responsible. A facility may be needed to support the operation but it might be another nation's operational estate that UK forces are merely permitted to use. Responsibility for infrastructure must be clarified in detail through Host Nation Support Arrangements (HNSA), Memoranda of Understanding (MOU) or Technical Agreements (TA).² This is explained in more detail in Chapter 9. The UK's operational estate must always be developed through coordination and cooperation with alliance partners in order to ensure operational effectiveness, efficiency and to avoid competition for resources.

203. **Funding.** Whilst equipment infrastructure is obtained and maintained in the UK through the Equipment Programme and Equipment Support Programme, when deployed, all elements of the operational estate are funded primarily through the Net Additional Costs of Military Operations (NACMO) process. There are also other sources of funds from Other Government Departments (OGDs) and elsewhere that may be drawn upon

¹ On Operation HERRICK, this was known as Joint Force Support (JFSp).

² Allied Joint Publication (AJP)-4.5(A), *Host Nation Support Doctrine and Procedures*.

principally for reconstruction support. This is explained in detail in Chapter 12.

204. **Risk taking and the military works area.** The Defence Infrastructure Organisation (DIO) sets the policy for the management of infrastructure within the UK, Permanent Joint Operating Bases (PJOBs) and other overseas garrisons. However, within the operational estate this function must be conducted as an integral element of the operational plan. When developing and managing the operational estate, issues of time, cost and quality must be weighed alongside such factors as the protection of the UK Armed Forces, force posture and political/presentational considerations. These operational factors weigh significantly in the risk/benefit assessment. Often, for operational reasons, compliance with the full suite of UK Health and Safety standards may not be practical – risk is therefore taken. Commanders are responsible for judgements regarding the nature of infrastructure provided and what risks may be accepted. Therefore it is for military commanders to determine the policy for the management and development of the operational estate. This defines a Military Works Area (MWA). The establishment of a military works area is the key tenet that underpins governance of the operational estate.

a. **Exposing risks.** The management procedures we use to develop and maintain the operational estate must identify and expose to commanders the full risks being taken in order that a balanced judgement can be made. The two most significant areas in this regard are:

(1) **Physical protection.** What level of protection is afforded by the infrastructure?

(2) **Safe management of the infrastructure.** How and why are derogations required from accepted UK Health and Safety standards?

b. **Military works area.** A military works area defines the geographic boundaries within which the needs of operational imperatives may be balanced against other regulatory obligations, for example, operational risk may be taken. The boundary of a military

works area will usually be coincident with the joint operations area (JOA). Only PJHQ can establish and disestablish a military works area.³ During the life of a military works area there is likely to be a migration from a policy of hastily provided operationally essential infrastructure having a short life and probably incorporating a degree of risk, towards longer lasting infrastructure which is more compliant with UK Health and Safety standards and other statutory obligations. The path and pace of this migration must remain the responsibility of the operational commander, advised by his Infrastructure Staff. Migration may not be homogenous across all areas of a military works area; the commander and his Infrastructure Staff will need to be very clear about what risks can be taken in each part of the military works area.

c. **Role of Royal Engineers in a military works area.** Royal Engineers underwrite⁴ the delivery of infrastructure support in a military works area: both new construction and maintenance. This can lead to the military intervening in the execution of a contract in order to ensure that mission is not jeopardised.

Insight 2-1: A thorough understanding of the implications of a military works area is fundamental to the competent governance of the operational estate and the delivery of infrastructure support:

1. Military commanders determine the acceptable risk based on the best advice available to them. Risk must not be taken blindly.
2. Royal Engineers underwrite the delivery of operational infrastructure support.

205. Requirement and delivery. For everything other than battlefield infrastructure, it is usual practice to separate requirement definition from the delivery of infrastructure support. The critical issues are the complexity of the requirement, whether there is a need for an Investment Appraisal and the

³ In the first few days of an operation where there is a threat from an adversary, there may be insufficient time for PJHQ to issue direction to establish an military works area. It may therefore be pragmatic to assume that it exists. However, PJHQ must ratify this as soon as practicable.

⁴ This is explained in more detail in Chapter 6.

time in which to prepare it. This is shown in Figure 2.1. Organisations generally, therefore, can be considered as having either a requirement, or delivery role. This separation of function, whilst optimised for efficiency and financial prudence, may not be appropriate in the early stages of an operation, nor for an operation where very little construction is needed. Organisation and command structures must take this into account and retain the inherent flexibility for PJHQ to select the most appropriate model. The delivery of support is explained in Part 2.

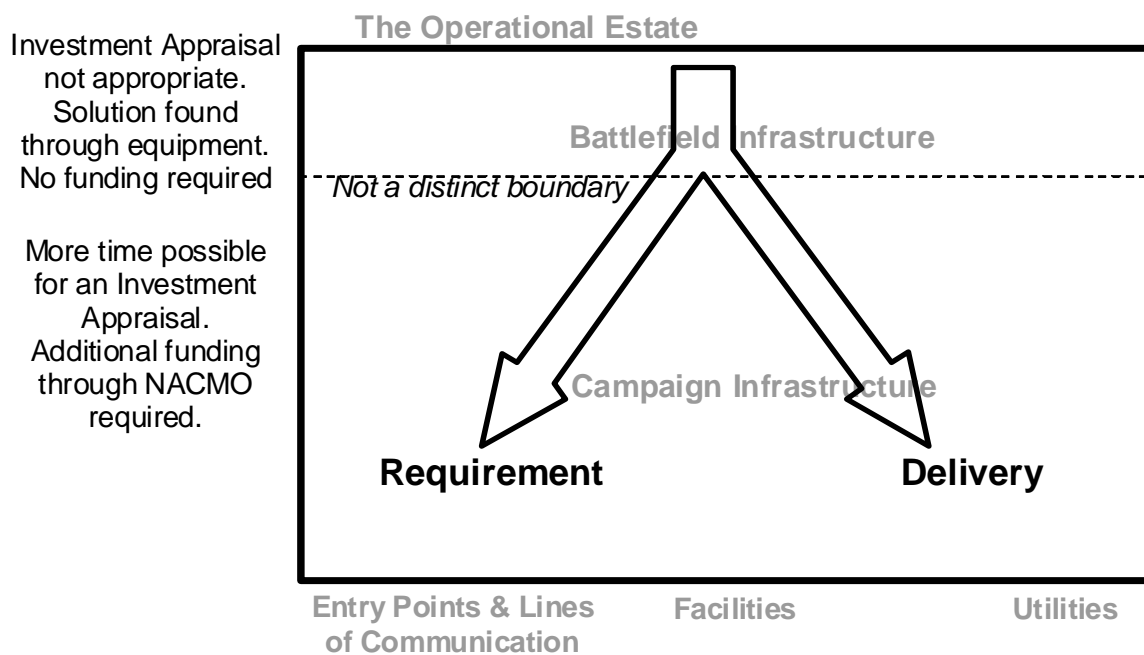


Figure 2.1 – Separation of requirement and delivery

Section 2 – Infrastructure Staff

206. **Estate management and the role of Infrastructure Staff.** Estate Management is defined as: *the inspection, servicing, repair and life cycle replacement of infrastructure...the financial management of these activities and (their) improvement...*⁵ Infrastructure Staff plan and facilitate Estate Management and make sure that it supports the development of the operational estate in accordance with the objectives of the operation.

207. **Command and control models.** The way in which PJHQ exercises in-theatre control over its operational estate varies with operational

⁵ JSP 435 Defence Estate Management.

conditions. Control of infrastructure is usually given to a supporting headquarters, when one is present. Often there is more than one candidate headquarters for this role. However, in a joint operations area there is usually (although not always) only one Infrastructure Staff. The appropriate number of Infrastructure Staff(s) and their subordination to a headquarters is determined by PJHQ. The guiding principle is to ensure there can be no possibility of competition between different supporting headquarters over real estate control and the access to resources required to develop Infrastructure Development Plans (IDPs) (construction force, equipment and materiel). PJHQ will also take into account the need for Infrastructure Staff to work closely with in-theatre financiers (specifically the Civil Secretary (CivSec)). Figure 2.2 shows some example command and control models.

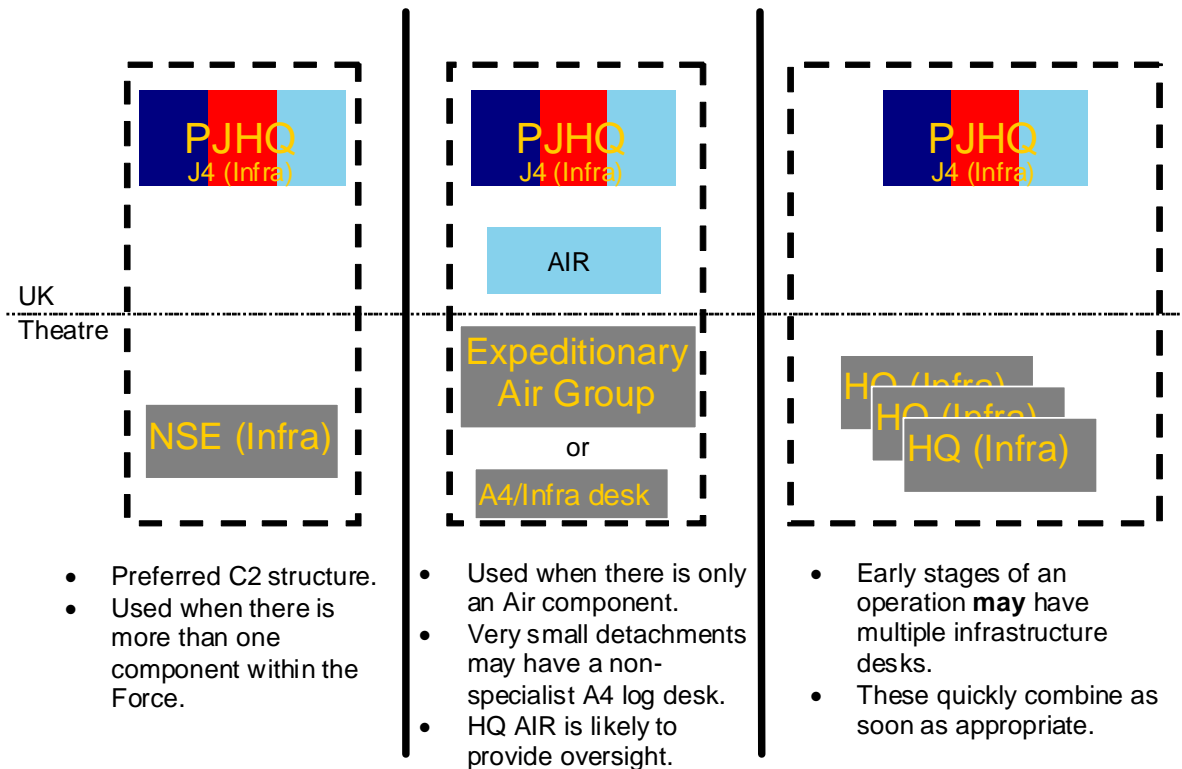


Figure 2.2 – Example command and control models

208. **Relationship between PJHQ and in-theatre Infrastructure Staff.** Campaign direction is given by PJHQ whereas detailed execution is delegated to theatre. However, as infrastructure projects invariably take a long time to come to fruition, PJHQ Infrastructure Staff provides continuity in the development of infrastructure in theatre. This is practised through the endorsement of development plans and the authorisation of funding for their

implementation. The National Support Element (NSE) (or other supporting headquarters) uses its embedded Infrastructure Staff to manage its client/customer responsibilities on behalf of PJHQ. Regular and close liaison is therefore essential between the Infrastructure Staff at PJHQ and in theatre.

209. **PJHQ Infrastructure Staff.** The operational Infrastructure Staff at PJHQ sits within J1/J4 Division. Its responsibilities include:

- a. The inclusion of infrastructure considerations in the development of future operational plans. This includes negotiating the longest planning horizon possible.
- b. Consideration of the potential exploitation of multinational collective arrangements.
- c. The strategic oversight of infrastructure planning, including the operational endorsement of major projects, both for current and future operations.
- d. Ensuring, with appropriate advice, that the requirement for new construction is properly considered when force levels, composition and their command status are under review.
- e. Ensuring that theatre is given adequate financial allocations and delegations associated with the anticipated infrastructure tasks.
- f. Coordinating the support to theatre given by international and UK agencies such as NATO Maintenance and Supply Agency (NAMSA), Defence Infrastructure Organisation (DIO) and Defence Equipment and Support (DE&S).
- g. Advising on the size, composition and location of infrastructure desks in theatre.
- h. Providing the operational context for the development of future capability and doctrine.

210. **Theatre Infrastructure Staff.** The assets required to build and maintain infrastructure within a joint operations area are finite and invariably in high demand. Often UK forces may be in competition with Host and Coalition Nations for contractors. It is important therefore that there is a single focus for the development of prioritised infrastructure plans within a joint operations area.

- a. **Senior Infrastructure Staff Officer.** In theatre a senior infrastructure specialist engineer normally fills post of Senior Infrastructure Staff Officer (SISO). At medium scale this is expected to be at least an OF4.⁶
- b. **Separation of duties.** The separation of duties is a fundamental principle for the good governance of infrastructure.
 - (1) There should be clear separation between the long-term planning function and that of the daily execution of tasks.
 - (2) To ensure financial probity, it is government policy to separate those responsible for stating the requirement and funding it, from those with commercial powers and the ability to clear bills for payment.
- c. **Integrated planning.** As explained in Chapter 1, operational and infrastructure plans must be developed together. The physical location of Infrastructure Staff is likely to be determined by the location of those staff planning the overall logistic support to the operation. Furthermore, in order to ensure finance is adequately provisioned, the Infrastructure Staff should be able to conduct regular liaisons with theatre J8 staff and with the CivSec, where one is present. The Infrastructure Staff will also require daily communication with those delivering infrastructure, both new works and maintenance. These factors will significantly influence the location of infrastructure desks within the joint operations area.

211. **Roles and responsibilities of theatre Infrastructure Staff.** The Infrastructure Staff does not command delivery assets; it identifies and sets

⁶ Experience has shown that at medium scale, the OF4 should be assisted by 3-4 OF3s and a couple of clerks.

prioritised requirements that are then delivered. It must therefore avoid being drawn into the day-to-day management of infrastructure delivery tasks. The Infrastructure Staff must, however, have a thorough understanding of how projects are delivered and maintenance conducted. In a theatre where a high degree of new work is planned, infrastructure specialists from either the RE or RAF should form the core of the staff. The theatre Infrastructure Staff are required to:

a. **Plan the detailed development of the operational estate.**

(1) Produce infrastructure development plans that are in-tune with the operational plan and Theatre Infrastructure Development Directive.

(2) Work with PJHQ to develop and agree an overarching Infrastructure Programme.

(3) Ensure operation and maintenance is adequately provisioned.

(4) Advise commanders on infrastructure procurement options and risks.

(5) Ensure that service personnel understands that it must plan other lines-of-development to achieve the capability that infrastructure supports.

(6) Ensure that the growth and change of use within bases is planned; sometimes referred to as *town planning*.

(7) Pass on lessons identified through a post-operational report.

b. **Capture and articulate requirement.**

(1) Capture and 'own' the requirement both for new works and maintenance; this includes assisting units to articulate their needs.

(2) Determine whether the requirement can be met through non-infrastructure means.

(3) Priorities requirements.

c. Facilitate delivery of infrastructure support.

(1) Provide in-theatre contract sponsorship.

(2) Identify and allocate real estate, including conducting a siting board.

(3) Obtain any 'planning permissions' and resolve safety issues such as flight-line obstructions, ammo storage safety distances and water treatment restrictions within a port.

(4) Obtain funding; exercise any financial delegations and prepare business cases.

(5) Act as Project Sponsor on behalf of their headquarters.

(6) Monitor expenditure against the limit-of-liability for each project/contract.

(7) Make sure projects are adequately managed.

d. Control and coordinate the development programme.

(1) Agree the most appropriate means of delivery by liaising with the Joint Force Elements (JFE).

(2) Scrutinise the proposed delivery plan to make sure that it will meet the requirement.

(3) Maintain the overall programme of work to develop the operational estate complete with priorities for delivery.

(4) Act as the client interface until completion, confirming that the proposed delivery solution will match the requirement and be fit for purpose.

(5) Act as the Infrastructure Defence Lines of Development (DLOD) coordinator for the development of an integrated capability (see paragraph 222).

(6) Produce and maintain force infrastructure Standard Operating Procedures (SOPs).

(7) Oversee the transfer to the Facilities Manager at completion, including conducting a handover board.

(8) Ensure infrastructure assets throughout the operational estate are recorded.

212. **Air infrastructure.** For the RAF, infrastructure at a deployed operating location is a key concern of the A5 Operations Support staff. It is not regarded as a component of logistics. Often an air component may be geographically isolated from the land component it supports. Therefore the infrastructure development for such a detachment is likely to be exercised through an Expeditionary Air Group (EAG), the Joint Force Air Component Headquarters (JFAC HQ) and/or Expeditionary Air Wing (EAW), all overseen by infrastructure specialists within HQ AIR. The staff at HQ AIR may therefore carry out some of the functions expected of the theatre infrastructure staff. Where considerable air infrastructure is required within a joint operations area, RAF specialists should be embedded within the infrastructure staff.

213. **Standard Operating Procedures.** Theatre Infrastructure Staff must maintain up-to-date theatre Standard Operating Procedures. These Standard Operating Procedures should be widely published and should address at least the following:

- a. A summary of the infrastructure related financial delegations held in theatre.

- b. Guidance to units on how they should raise and articulate their requirement for new work; see an example at Annex 2A.
- c. Facilities management arrangements including detailed instructions to units on how they should report faults.
- d. The control of equipment infrastructure.
- e. Guidance to units on items related to new infrastructure but not those for which the Infrastructure Staff is responsible, for example, new telephones and furniture.

214. **Quartermasters and Unit Logistics Staff.** Units have their own organic logistic staff, such as quartermasters. They are not Infrastructure Staff. They are *user representatives* and as such, allocate bed spaces, report faults, carry out safety checks on unit equipment⁷ and make sure that accommodation is handed over from unit-to-unit in good order. Quartermasters, not Infrastructure Staff, are responsible for items such as furniture.

Section 3 – Planning

215. **Planning.** The planned development of the operational estate must be intimately tied to the anticipated requirements of the campaign; how, where and when will force elements be deployed and sustained? Infrastructure planning is therefore an intrinsic and key element of the logistic planning to support the UK Armed Forces. As explained earlier, operational infrastructure is a line of development in the overall capability of the UK Armed Forces. Conversely, the constraints imposed by infrastructure must be taken into account when developing the campaign plan. Therefore the infrastructure staffs are embedded both at PJHQ and in the National Support Element or other appropriate HQ in Theatre.⁸ They must be able to work closely with J5 staff in developing plans. Annex 2B shows how decisions regarding infrastructure development usually take far longer to implement than most operational decisions.

⁷ Such as Portable Appliance Testing (PAT).

⁸ On Op HERRICK the National Support Element (NSE) function is performed by JFSp(A). On remote Dispersed Operating Bases (DOBs), where there is no formal National Support Element, an Expeditionary Air Wing may undertake an National Support Element's infrastructure function.

Insight 2-2: Infrastructure constraints and freedoms must be realistically incorporated into all operational plans.

- a. **Theatre Infrastructure Development Directive.** PJHQ produces and updates the Theatre Infrastructure Development Directive (TIDD). The Theatre Infrastructure Development Directive establishes overall priorities and sets critical standards. It may also be used to establish an estimate of the overall finance required to develop the operational estate, thus providing the context and overall justification for subsequent business cases.
- b. **Infrastructure Programme.** An Infrastructure Programme shows how projects across a joint operations area are scheduled to deliver the work needed in the site-specific Infrastructure Development Plans. It gives an operational-level perspective of the development of the Estate. This is explained in more detail in Chapter 4.
- c. **Infrastructure Development Plans.** Infrastructure Development Plans are produced in theatre. These site-specific plans give detail to the Theatre Infrastructure Development Directive. The Infrastructure Development Plans in turn inform the next iteration of the Theatre Infrastructure Development Directive. The relationship between the two documents is shown in Figure 2.3 and is detailed in Annex 2C.

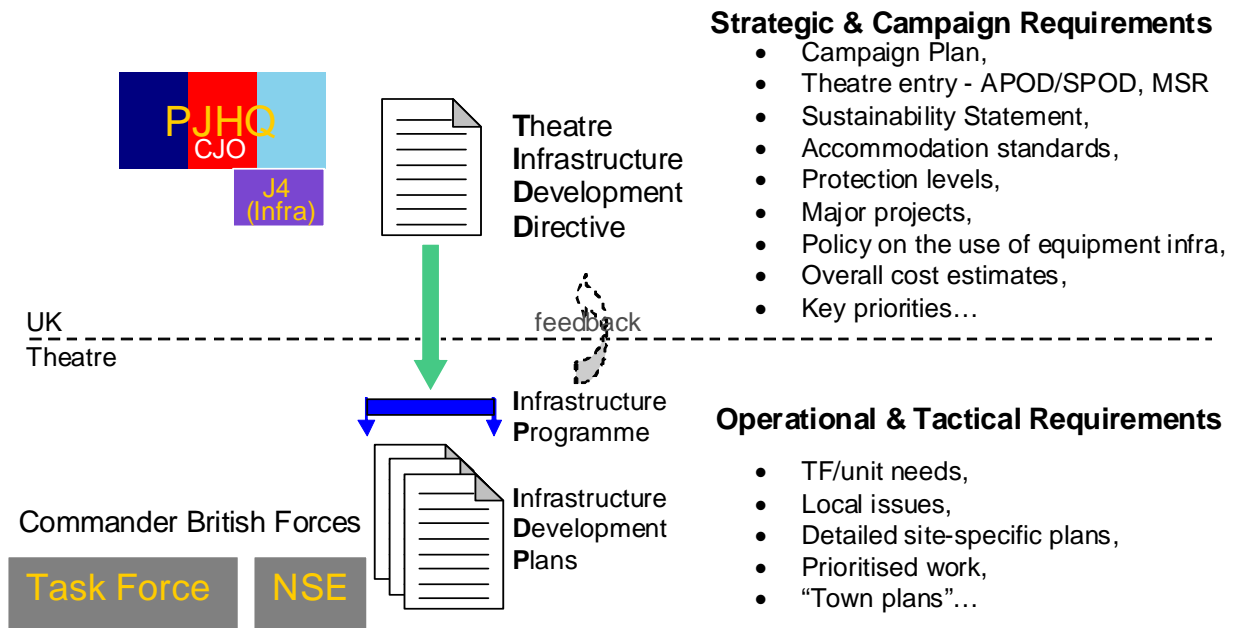


Figure 2.3 – Planning the development of the operational estate

216. **From early entry to enduring.** The need for infrastructure will vary from operation to operation. However, it is highly likely that equipment infrastructure, indigenous infrastructure and constructed infrastructure will all be used from the outset and throughout the duration of the campaign; only the balance between them will alter. This is shown in Figure 2.4. Items of equipment infrastructure, held organically by units, provide the most flexible, mobile solutions. However, over time, as units become static, either this equipment may be augmented with constructed solutions or replaced by them. The replacement of equipment with constructed solutions will be made after due consideration of operational factors as part of an investment appraisal conducted by PHJQ/theatre. This must take into account whether it is better to continue to use that equipment infrastructure or whether it should be returned to the UK for refurbishment and aid in the restoration of contingent capability. Advice from DE&S and the Capability Sponsor is critical at this stage.

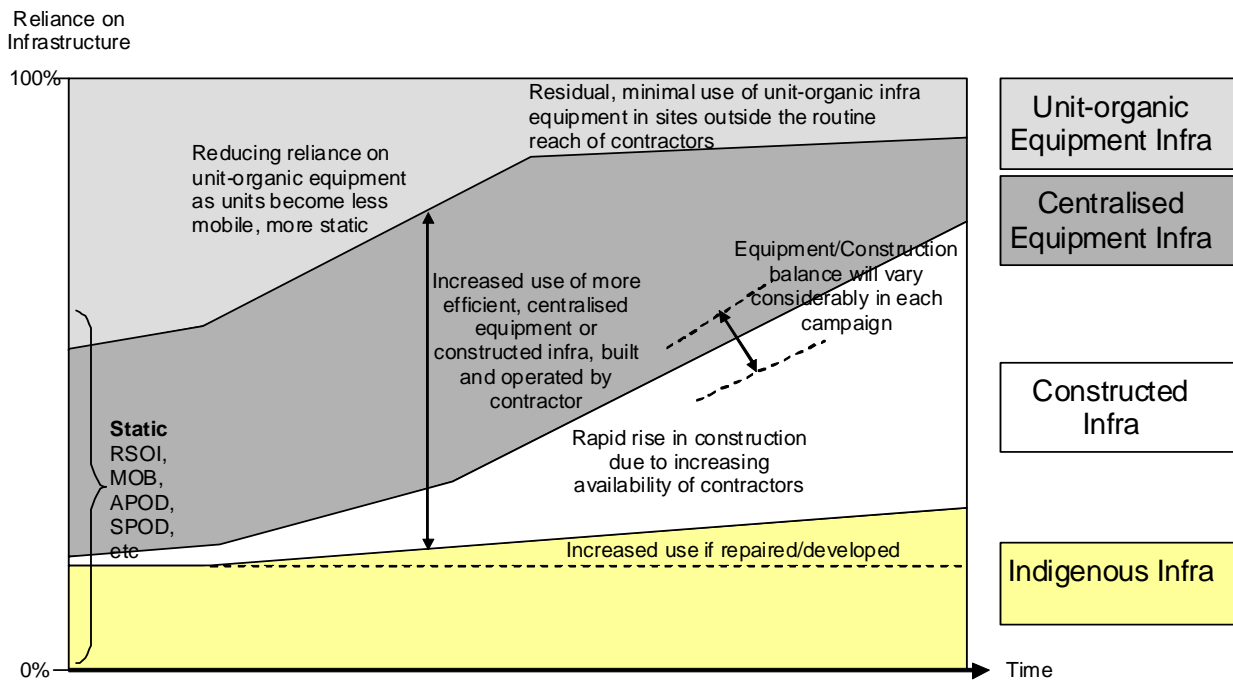


Figure 2.4 – Schematic, typical evolution of the operational estate

217. **Addressing infrastructure challenges during early entry.** The early stages of an operation are challenging. There is inevitably a focus on delivering military effect as quickly as possible. This often means that there is insufficient time to consider infrastructure issues. If they can be considered early, the operational benefit of prudent decisions can be felt sooner, for example, replacing multiple towed generators with a generator farm can reduce the numbers of personnel in theatre and the effort the UK Armed Forces must expend merely to sustain itself. It is the responsibility of the Infrastructure Staff to make sure that sufficient attention is given to infrastructure issues.

218. **Duration.** Time-based categorisation of infrastructure is often attempted, however, it is of little practical use for operational infrastructure. It is particularly difficult to forecast the duration of a UK military mission outside the UK's overseas territories and dependencies. Furthermore, the utility of infrastructure is inextricably bound to the progress of the mission, which is even harder to forecast with certainty. The requirement for operational infrastructure can only be seen in relation to the mission. Nevertheless, the selection of appropriate infrastructure and its development must be set in the context of some form of anticipated duration. A fundamental input to any Investment Appraisal is an estimate of the likely duration of use.

a. **Permanent and temporary.** Terms such as ‘permanent’ and ‘temporary’ are of little practical use as they are more strongly associated with how long something *can* last, not how long it is *needed*. They give rise to confusion during the investment appraisal process and *should not be used*.⁹ Even structures made of more permanent materials, such as concrete and steel, which can be expected to *last* for a very long time, may only be *needed* for a short duration. Unless there is a planned post-mission use for an item of infrastructure, it is better to make a reasonable estimate of the *required design life* in absolute terms, for example, ‘12-36 months’ or ‘up to 5 years’, and describe its use accordingly. It should be noted however that Defence will normally only fund Equipment Programme solutions for up to 18 months. Nevertheless, in a joint operations area there may be cases where a longer period of use can be justified. Any infrastructure planned to endure beyond that period may be funded through Net Additional Costs of Military Operations.

b. **Static and enduring.** Of more use are the terms ‘enduring’ and ‘static’, these are more closely associated with benefits of equipment over constructed solutions. For practical purposes, any base that is anticipated to stay in place for longer than one unit/formation rotation (typically six months) can be considered to be ‘static’. The term ‘static’ is preferred to ‘fixed’ as this implies that it can *never* move. This may or may not be so. Cabins, for example, are not truly mobile, nor once erected, are they truly fixed in place. The significance of identifying a location as ‘static’ is that this then defines the extent of the operational estate (see Chapter 1).

Insight 2-3: Unless they are intended to remain as a post-campaign legacy, do not refer to elements of the operational estate as ‘permanent’ or ‘temporary’. Use the terms ‘static’ and ‘enduring’ and describe them in terms of the *period of intended tenure*.

219. **Time, cost and quality in an operational context.** The decision on whether the most appropriate solution is through equipment or constructed infrastructure, or, indeed, a combination of the two, will be influenced by

⁹ This is another reason why the NATO definition of infrastructure is not used.

considerations of Time, Cost and Quality (TCQ). However, any decision must also take into account the degree of hazard in the specific location, the availability of resources, and the impact on the conduct of the operation. These are often local factors and involve risk taking against the operational mission. It is therefore best for operational commanders to make them. It should also be noted that the appropriateness of any solution may change over time and may have to be reconsidered. Figure 2.5 shows how decisions are made on the most appropriate infrastructure solution at *any specific location*.

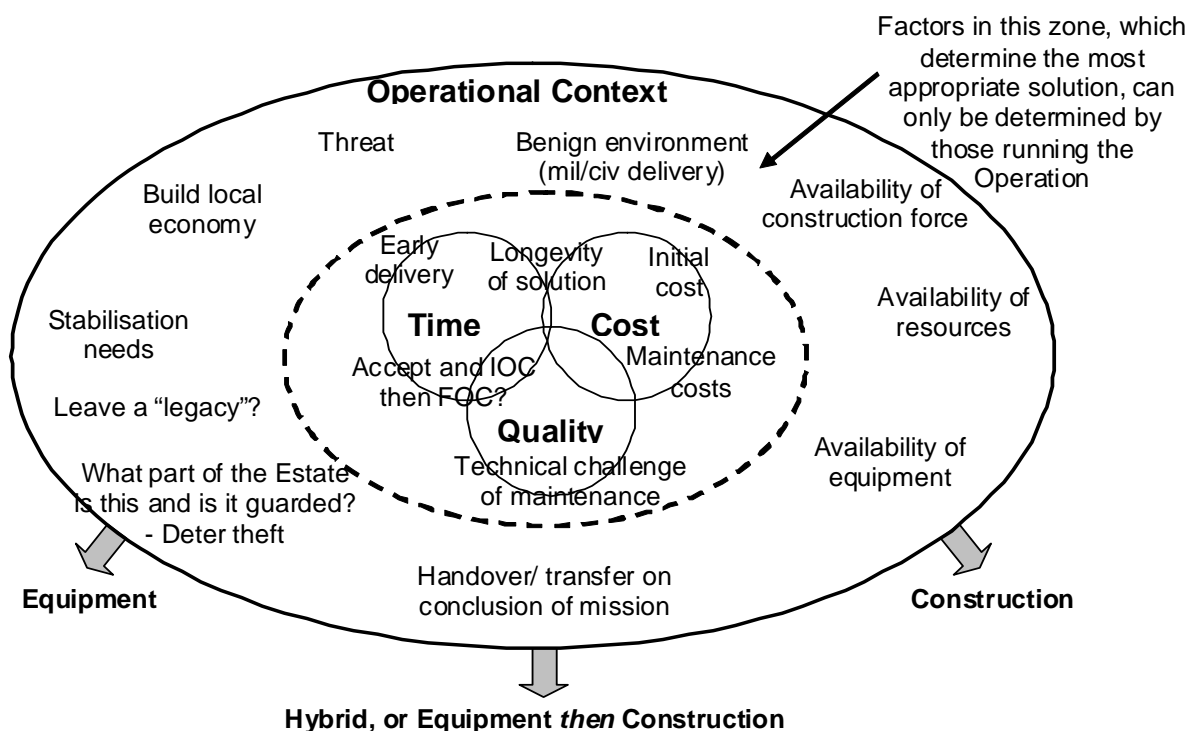


Figure 2.5 – Time, cost and quality (TCQ) in an operational context

220. **Support to decision making.** As explained above, the decisions on how to meet a specific infrastructure requirement are taken by theatre and/or PJHQ depending on the scope and impact of the issue. The connection between the relevant staff in theatre and PJHQ effectively forms a decision making space in which the plan for the development of the operational estate is formed. The decision making process requires considerable support if the most appropriate solution is to be found. Usually the decision is made through an investment appraisal within a business case. Determining the cost to the Reserve through Net Additional Costs of Military Operations is

relatively straightforward. However, the overall cost to Defence must also be considered particularly when developing the Theatre Infrastructure Development Directive, upon which these decisions are ultimately based. The ability to make timely and well considered decisions is highly dependent therefore on the capacity (numbers of staff) and of the capability (training and experience) of this decision-making space at PJHQ and in-theatre.

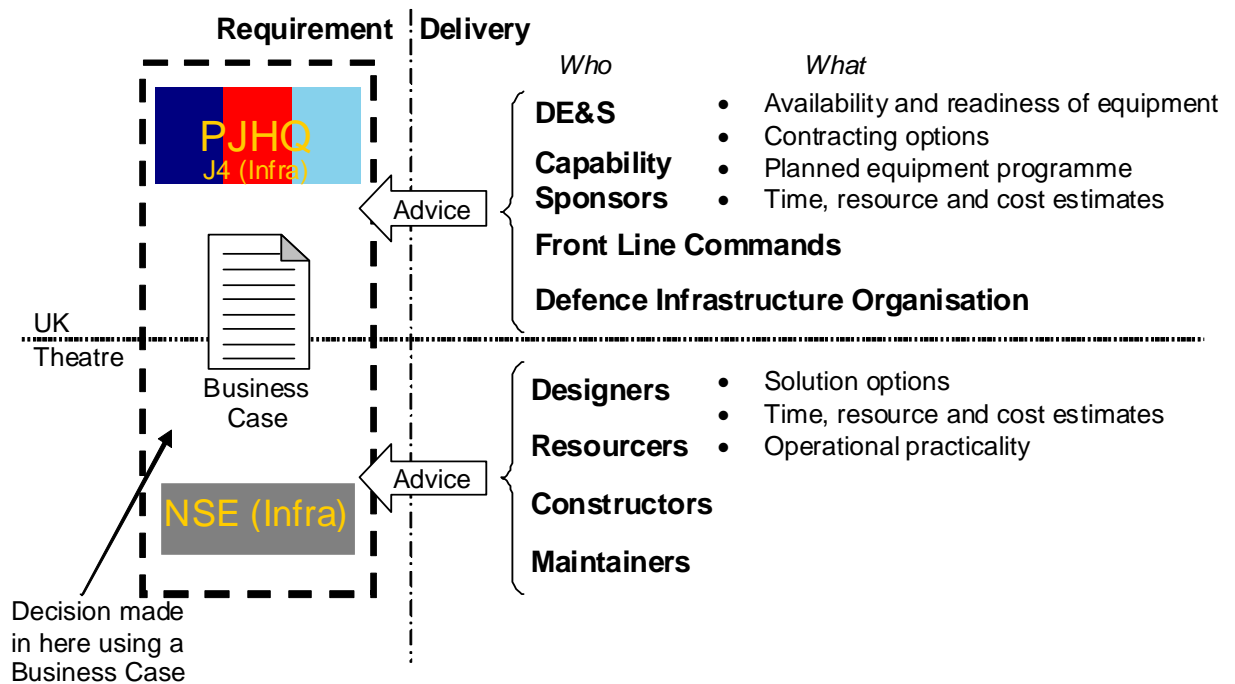


Figure 2.6 – Support to decision making

221. **Decision making in the operational ‘fog’.** As explained earlier, the determination of the most appropriate solution is made through the investment appraisal process, which in turn is based on an anticipated duration of use. The duration of any military operation is very difficult to predict with the degree of certainty needed to secure funding. The high cost of infrastructure can be hard to justify if service personnel may relocate or, indeed, if UK involvement in a campaign may only be for a short while longer. The timeline of a campaign will have many anticipated/forecast events stretching several months ahead (for example, troop-level uplifts, elections, and operations to destroy a particular adversary). The outcome of these events may have a significant influence on the required future configuration and lay-down of the UK Armed Forces, or, indeed, whether the UK Armed Forces will be required at all. Understandably, commanders and politicians

will wish to wait for the outcomes of these events to become clearer before committing funds. Unfortunately, this all too easily results in decision making paralysis and consequently to wasteful and sub-optimal development of the operational estate. This operational 'fog' often limits planning horizons to fractions of a year: too short a period over which to realise the benefits of most infrastructure investments. In order to drive into this fog, one must therefore not select the 'optimum' solution, but the one, which if wrong, results in the least worst outcome.

Insight 2-4: Decision making paralysis due to uncertainty over the path and progress of a campaign is the major cause of inefficiency, paucity of protection and wastefulness in the development of the operational estate.

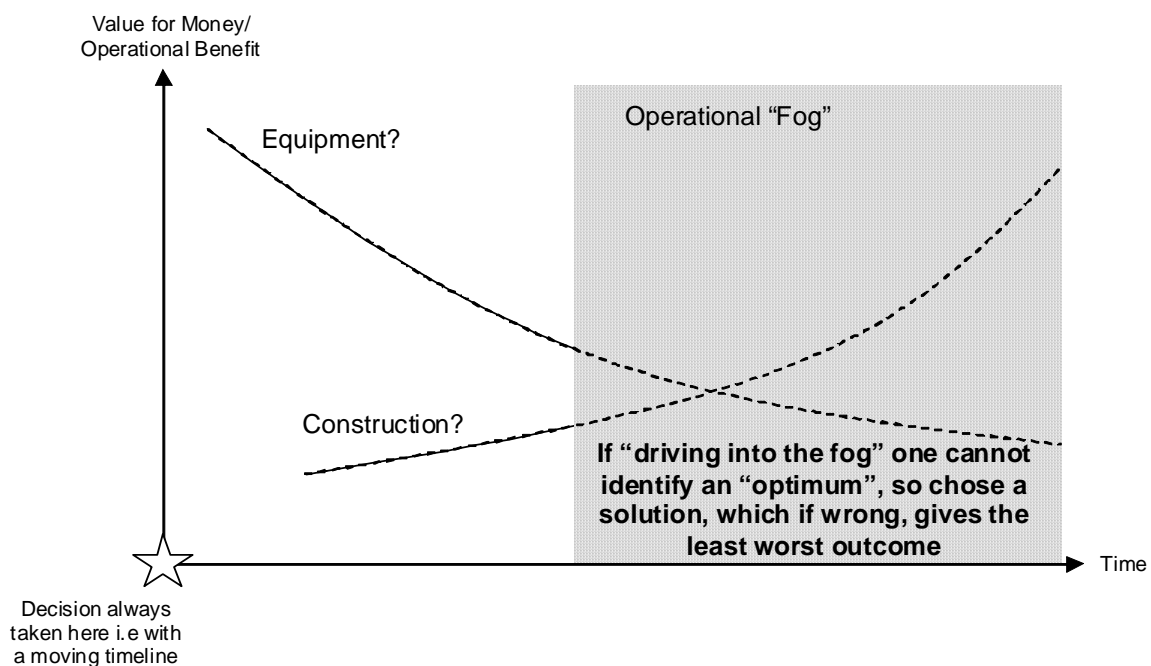


Figure 2.7 – Decision making in the operational 'fog'

222. **Operational infrastructure as a line of development.** As explained earlier, operational infrastructure is a line of development for deployed military capabilities. Planning operational infrastructure is therefore always set in the context of developing some other capability, for example, a hospital, or the facilities to support and uplift in Force numbers.

a. **In-theatre capability integration.** Capability integration is required in-theatre to make sure that site-specific needs are appropriately addressed.

(1) **Specialist projects.** For some specialist facilities, such as, headquarters, air traffic control, and medical and equipment support facilities a project manager must be appointed to make sure that all lines of development are coherently developed along with the operational infrastructure.

(2) **Base capability integration.** This integration of capabilities is also required for each base, particularly Tactical Bases. This is explained in more detail later.

b. **Equipment development.** Equipment, whether part of the Equipment Programme or Urgent Operational Requirement, must consider the operational infrastructure that it will need to achieve its operating capability. The roles of Cap (ELS) and Front Line Commands (FLCs) (often through HQ EinC(A)) are central in this.

223. **Continuity.** The planning and development of the operational estate requires a long-term perspective. Furthermore, the time taken from inception of requirement to handover of a facility very often takes many months. As most of the detailed decisions are taken in-theatre, the roulement of personnel every six months can lead to significant problems, for example, change or cancellation of requirement, or loss of key pieces of information. Continuity is maintained by the staff at PJHQ, DE&S and through specific continuity appointments within the Military Design Authority and Front Line Commands.

Section 4 – Reconnaissance

224. **The need for reconnaissance.** The condition and capacity of indigenous infrastructure will have a major impact on the requirement for additional infrastructure especially at the outset of an operation. Similarly, the availability and capacity of local or regional contractors will significantly influence the force levels required, at least initially. These can only be determined by reconnaissance by experienced personnel. The importance of conducting an early and detailed reconnaissance, while most probably being constrained by time and limited in numbers, needs constant emphasis.

225. **Strategic reconnaissance.** PJHQ conducts strategic reconnaissance, which is primarily concerned with **what** needs to be done. Strategic reconnaissance is needed not only at the outset of an operation but also whenever any major changes are required.

a. **Information needs.** Prior to the reconnaissance, the officer advising on infrastructure matters needs to have:

- (1) A full appreciation of the Joint Commander's intent.
- (2) A detailed understanding of the likely infrastructure requirements of the components making up the Joint Force.
- (3) As full an appreciation as possible of the UK Armed Force's infrastructure capabilities, the resources likely to be available within the timeframe of the operation and the technical standards which may have to be met.
- (4) An appreciation of the type and condition of local infrastructure. Preferably, a desktop study would identify locations on which to focus.¹⁰
- (5) Knowledge of the consultation paths and procedures necessary to negotiate host nation, and any coalition nation's, assistance. What collective or lead-nation arrangements exist or are required?

¹⁰ This is often referred to as *engineer intelligence*; there are a number of sources that may provide it.

(6) A detailed understanding of the likely infrastructure support capability of the deployed force (both military and contracted).

(7) Some idea of the length of time the infrastructure may be needed.

b. **Outputs.** The outputs required include:

(1) An outline of the key force elements required to deliver and sustain infrastructure.

(2) Contributions to the Sustainability Statement.

(3) An outline of the Theatre Infrastructure Development Directive.

(4) An estimate of costs to assist early contractual and financial planning, including negotiations.

(5) The availability of host and/or coalition nation support and plans to avoid competition for resources between allies.

(6) Any requirements that may need Urgent Operational Requirement action.

226. **Operational reconnaissance.** The subordinate headquarter¹¹ conducts subsequent, detailed operational reconnaissance that contributes to decisions on **how** the operational requirements, identified during the strategic reconnaissance, are to be matched by the available capabilities. RE technical specialists are likely to be involved in the operational reconnaissance.

a. **Information needs.** As with the strategic reconnaissance, the operational reconnaissance party should include the necessary infrastructure and associated engineer logistic knowledge and experience to determine the standards and methods of implementing infrastructure requirements. Resources and lands issues become

¹¹ For example, Joint Task Force Headquarters (JTFHQ) and Joint Force Support (JFSp).

more important at this stage. There may also be a need to make good deficiencies of information following the strategic reconnaissance.

b. **Outputs.** The outputs include:

- (1) Input to the Joint Force Element Table (JFET).
- (2) Initial, outline Infrastructure Development Plans.
- (3) Shortfalls against host nation or coalition-provided facilities, including Status of Forces Agreements (SOFA), Memorandum of Understanding (MOU) or Military Technical Agreements (MTA).
- (4) Refinement of costs and Urgent Operational Requirements.
- (5) The methods by which coherence between all infrastructure requirements is achieved.

Section 5 – Planning estimates

227. **The need for planning estimates.** Good estimates of time and resources required are fundamental to establishing a viable plan. While these may be refined over time, it is critical that early infrastructure estimates have as great a fidelity as possible and that anyone using those estimates is made aware of the degree of uncertainty in the estimate. There is always a tendency for commanders on operations to press for an ever-faster (sometimes cheaper) delivery. Overly optimistic, early estimates have been consistently proven to lead to poor decision-making. Over time, commanders and planners may come to respect the infrastructure advice given and develop realistic plans – but only if those estimates are repeatedly proven to be correct and are neither conflated nor inadequate.

Insight 2-5: Good estimates of time are important, especially early in the planning phase. Make sure, however, that those using the estimate are aware of the assumptions made and understand the degree of uncertainty inherent in the stated figures and hence the level of fidelity.

228. **Experience.** Unfortunately there is no adequate substitute for current experience when it comes to making good estimates. The best source of advice is from those personnel who have recently built similar things in similar locations or will actually be required to build the infrastructure being planned.

229. **Timeliness, accuracy, fidelity and 'show working'.** In the early stages of planning, the timeliness of an estimate is most critical in order to allow others to make informed decisions. However, there is likely to be insufficient information upon which to make a good estimate. The *accuracy* of an estimate at this stage refers to how vague the value is quoted as being, for example, 'plus or minus 20%'. This should not be confused with the *fidelity* of the estimate. This is how likely it is that the estimate itself is correct. The degree of uncertainty must be conveyed in the estimate. Similarly, any assumptions upon which the estimate is based, must be given e.g. the availability and skill of the construction force, the permissiveness of the environment and the supply of materiel. Statements of fact, such as cost estimates produced through analysis, should be supported by a reference of some kind, even if it is merely an email.

230. **Improving the fidelity of an estimate.** The degree of fidelity of the estimate will be limited by the time available in which to make it. Often only an estimate by experienced Infrastructure Staff may be feasible in the time allocated. Sometimes the estimated length of time may be unpalatable to planners; the Infrastructure Staff may then be asked to make another estimate. If this is the case, there is no point in the staff making repeated guesses; some other, more accurate estimating method must be made if it is intended to progress the plan. Therefore when giving an estimate it is important both to convey the degree of confidence in the estimate and what must be done to obtain a more accurate estimate.

Insight 2-6: Do not make repeated guess-estimates. Always seek to use a more accurate technique for subsequent estimates. State what work must be done to achieve this.

231. **Estimating techniques.** There are two general types of estimating technique:

a. **Deterministic.** A deterministic technique produces a single value. The processes are usually simple and quick. However, they are often inaccurate.

(1) **Bottom-up.** The various stages of the work should be broken down and an estimate given for each. This also serves to make sure that the full scope of work is identified from mobilisation of the construction force to commissioning and handover. The latter can be lengthy especially for a complex facility such as a hospital or headquarters.

(2) **Comparative.** A quick estimate can be made by comparison with previous, similar work. However, it takes little or no account of the impact of differences between previous work and that proposed.

(3) **Parametric.** Building on a comparative estimate, it may be possible to look in more detail at how the constituent parts of the planned work contribute to the overall time and cost. An adjustment to this overall estimate is made by adjusting the time and cost associated with those constituent parts that differ from the previous work. For example, if two projects were the same except for the number of accommodation blocks, the time and cost associated with those structures would be adjusted pro-rata and used to adjust the estimate for the overall project. This is more accurate than a comparative estimate, but relies on the availability of detailed cost data from previous work.

(4) **Delphi method.** This method relies on estimates made by a number of experienced experts. They each make an initial estimate independently from one another. These are then compared and averaged. If time permits, the results are passed back to the experts who then make another, more refined estimate. This is a relatively quick and often fairly accurate

estimating technique. However, it relies on the availability of more than one expert.

b. **Probabilistic.** Probabilistic estimating techniques are used to take account of the *probability* of things occurring that impact on the estimate. This is a more accurate way of addressing uncertainties, as the figures in the estimate are expressed as a probability or 'confidence level'. Examples of probabilistic techniques are three-point estimating and Monte Carlo simulation. Their disadvantages are that they can be time consuming to produce and are often mistakenly considered to be absolutely correct. They should only be used when calculating cost estimates as part of a business case.

232. Estimates of time – quoted as a duration between two points.

Too often planning is based on a quoted single date for completion, for example, '...ready by June'. This invariably is given on the mistaken assumption that the decision to proceed is immediate. It is far better to give an estimate of the duration of the work bounded by two points.

a. **Start date.** This is best quoted as being 'from the decision to proceed', 'on approval of the business case' or 'on arrival of the activation party'.

b. **End date.** This is usually best given as an Initial Operating Capability (IOC) and/or a Full Operating Capability (FOC). What that means in practical terms must be given alongside the estimate.

233. Estimates of cost. Initial planning estimates of cost do not need to be as accurate as those made of time. This is because the calculation of costs will be subject to a far greater degree of scrutiny later as part of the Investment Appraisal process. This is covered in more detail in Part 4. There are both military and contractor sources of cost estimate.

a. **Military sources.** As a theatre becomes more established, the Military Design Authority should establish and maintain a database of costs. Other than this, there are three main military sources of cost estimate:

(1) **Staff Estimate.** This is a quick, but inaccurate deterministic estimate by the staff.

(2) **Initial Works Group Report.** Often referred to as an Operational Infrastructure Recce Report (OIRR), an initial Works Group report can also help to scope the full requirement. However, in order to complete such a report in time, theatre may require additional resources. An Operational Infrastructure Recce Report also gives a time and resource estimate.

(3) **Detailed Works Group Report.** Often referred to as a Tactical Infrastructure Recce Report (TIRR), a detailed Works Group report also gives a time and resource estimate. However, a detailed requirement must be established and agreed beforehand.

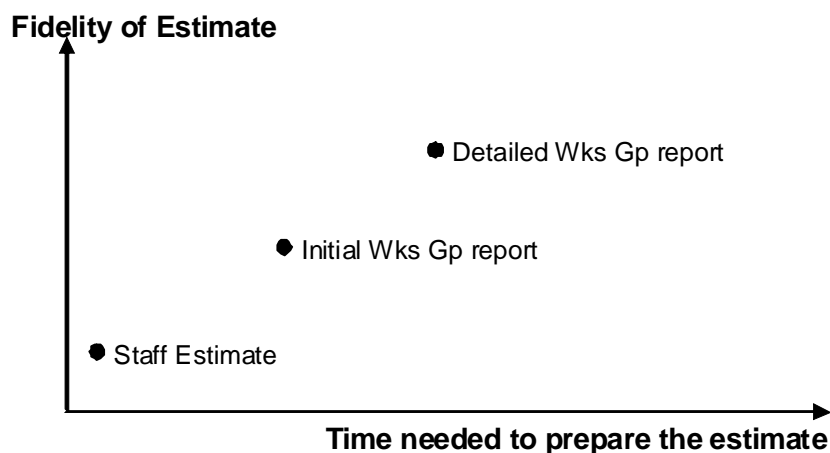


Figure 2.8 – Military sources of cost estimate

b. **Contractor sources.** Estimates made by a contractor are commercial-in-confidence and must be protected. If seeking such an estimate, care must be taken not to jeopardise the impartiality of any future tendering process or contract.

(1) **Indicative proposal.** Sometimes referred to by contractors as an 'estimate'. Quick, but inaccurate, it is not contractually binding. It may also be referred to as a Rough Order Magnitude

(ROM) 10 or 20. This means that the cost is estimated to be within 10 or 20% of the final quote.

(2) **Commercial proposal.** Sometimes referred to by contractors as a 'quote'. This gives an estimate with sufficient fidelity for a contractor to be prepared to enter into a binding agreement. It is intended as an initial offer and it is often expected that the Authority may alter some of the provisions regarding risk or select one of a number of options, thus altering the cost as set out in the proposal.

(3) **Tender.** A tender has formal contractual status. It is not usually subject to negotiation. Tender costs are usually only valid for 30 days unless otherwise specifically agreed.

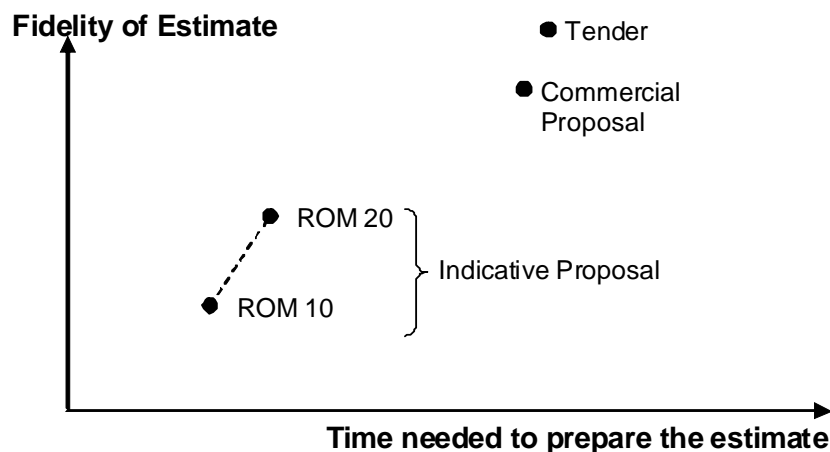


Figure 2.9 – Contractor sources of cost estimate

234. **Estimates of construction force.** Estimates of the size and composition of the construction force are best obtained from those who will be required to deliver the infrastructure. It is important to make sure that J3/J5 appreciate the large numbers of additional personnel that this may entail.

Section 6 – Defining the requirement

235. **Requirement and delivery.** As detailed earlier, other than for battlefield infrastructure, it is *usual* practice to separate requirement definition from the delivery of infrastructure support. The in-theatre Infrastructure Staff are responsible for clarifying and formally stating the requirement *and* then facilitating delivery. The responsibility for actually doing the work (its delivery), rests with others. A close and good working relationship is essential between those who *require* and those who *deliver*.

236. **Determine how the project will be funded.** Before developing the requirement, the means of funding the project must be identified. This is explained in Part 4. The rules governing how that funding may be spent will significantly affect both the requirement and how it may be delivered.

237. **The requirement for infrastructure.** Very often the operational need upon which a requirement is founded may well be better addressed through some means other than new or modified infrastructure; it may be better to change management procedures or adopt different working practices, for example.¹² Every effort should be made to avoid having to increase the size of the operational estate. Invariably there is an expectation that infrastructure can be delivered far quicker and to a much higher standard than is practicable. Infrastructure Staff must avoid over-loading the delivery organisations and therefore manage the expectations of those requiring the solution.

Insight 2-7: Infrastructure staff need to be pragmatic, articulate, resolute, diplomatic and experienced in infrastructure provision.

238. **Capture, analyse and test.** There are three basic actions involved in the definition of a requirement: capture, analyse and test. The aim is to identify what is *needed* rather than what is *wanted*.

239. **Getting the requirement correct.** The single most *important* part of any project is an accurate, unambiguous articulation of the requirement. The single most *difficult* part of a project is the accurate, unambiguous articulation

¹² Alternative provision such as hotel accommodation (HOTAC) or leasing apartments may be appropriate.

of the requirement. Without a well-framed requirement, the infrastructure may be late, in the wrong place, to the wrong standard, unsafe, and probably overly expensive. However, in the fluid environment of deployed operations, the construction and contracting required to deliver infrastructure support often moves at too slow a pace to expect it to stay in perfect harmony with the rapidly evolving requirements of a campaign. Therefore the test of success (whether something is *correct*) must be ‘is it good enough?’ not ‘is it optimal?’ This must be the benchmark against which any changes must be assessed.

Insight 2-8: Every effort must be made to establish an accurate, unambiguous articulation of the requirement. However, it must be recognised that this will invariably not deliver what that requirement may evolve into. Success should be judged by whether it is good enough, not whether it is optimal. A degree of expectation management is required.

240. **Stating the requirement.** Regardless of the type of infrastructure required, the requirement should be written down or otherwise recorded. Due to changeover of staff and the length of projects, few personnel will see a single project through from inception to disposal. Once agreed, the requirement must be frozen to allow design to conclude and construction to start. If this is not done it will lead to cost and time overruns. The requirement should be:

- a. Well-structured, with priorities.
- b. Clear and unambiguous.
- c. Comprehensive, although not overly detailed.
- d. Traceable, in order to manage changes.
- e. Testable, in order to confirm that what is delivered matches the requirement.

Insight 2-9: Express the requirement in terms of *what* effect is required; avoid unduly stipulating *how* it is to be achieved.

241. **Minimum Military Requirement.** The planned provision of infrastructure *must* only be to the Minimum Military Requirement (MMR). Through the Theatre Infrastructure Development Directive, PJHQ may specify what the Minimum Military Requirement actually should be. Theatre should highlight where it is not practicable to achieve that Minimum Military Requirement. JSP 435 *Defence Estate Management* defines Minimum Military Requirement as:

'A standard of scope, construction and finish that meets both the statutory and military requirements without unnecessary aesthetic or quality enhancements. It is meant to ensure a robust form of construction to provide the lowest whole life costs. This may mean that more expensive, high quality materials are appropriate to provide the best overall value for money.'

242. **Statement of Need and User Requirement Document.** The requirement for any infrastructure support should be clarified through a Statement of Need (SON)/Statement of Need (SOR). The unit or organisation requiring the new infrastructure (the user or sponsor) is responsible for raising the Statement of Need/Statement of Need. Most military organisations are familiar with describing this as a 'requirement' and so the term Statement of Need is in common use. However, as explained earlier, it is important to identify what is actually *needed* and so the term Statement of Need is often used when managing the subsequent project. The usual practice is to expand on the Statement of Need/Statement of Need to identify and capture the elements of the requirement in a tabulated User Requirement Document (URD). Annex 2A shows an example of the format a unit may use to make its Statement of Need. Where appropriate the Statement of Need can be followed up with a User Requirement Document. The User Requirement Document provides a written record that can be used to assess whether what is delivered matches what was originally requested. In the User Requirement Document a serial number should be assigned to each element of requirement. It should describe the requirement in output terms and articulate the standard required. The requirement should state

what effect is required. It should say *how* the infrastructure will be used, allowing the designers to determine the best way to achieve it. The User Requirement Document will record a number of key features:

a. **Priority.** A priority should be assigned to each element of requirement.¹³

(1) Key User Requirements (KURs), are the Critical Success Factors without which the facility/service will not possibly be fit for purpose i.e. not be 'good enough'. During the construction or delivery of support, these may form the basis of Key Performance Indicators (KPIs).

(2) Any other priority is coded P1, P2 (and so on) to reflect lower priorities.

b. **Time.** When is the structure/support needed:

(1) From and until (if known).

(2) Can/must it be delivered in stages (Initial Operating Capability (IOC)/Full Operating Capability (FOC)).

c. **Ownership of an element of the requirement.** Establish who 'owns' each element of the requirement; the organisation/authority which is entitled to agree to trade this element off against a possible solution.

243. **Using the designer to help develop the requirement.** For complex projects the development of the User Requirement Document may need to be undertaken iteratively, hand-in-hand with design, to ensure what is asked for is achievable. However, this must be closely controlled throughout by the Infrastructure Staff in order to make sure that the designer's time is not wasted and that the requirement is not over-embellished. Regardless of the assistance they receive, it remains the responsibility of the Infrastructure Staff to develop any requirement.

¹³ Note: the priority of the entire work must also be established as part of the overall programme of development.

244. **Subject Matter Experts and continuity of requirement.** UK-based Subject Matter Experts (SME) help to make sure that the requirement is correctly expressed and provide continuity in a complex project. In-theatre Infrastructure Staff should make sure the user has sought UK-based Subject Matter Experts guidance, if it is appropriate. If a user puts forward a Subject Matter Expert to help develop the design, they should be instructed to liaise with the Military Design Authority and not directly with any contractor. Typical projects for which a UK-based Subject Matter Expert is appropriate are:

- a. Hospital design – Army Medical Directorate (coordinated through PJHQ J4 Med Branch)
- b. CT scanner – DE&S
- c. Fire Regulations – Defence Fire Risk Management Organisation (DFRMO)
- d. Kitchen design – Land Forces (Log)
- e. Intelligence facilities – 2 MI Bn
- f. Ammunition storage – HQ LF (Log Sp) or HQ AIR (A4) if it is for solely Air use
- g. Range design – Technical Advisory Section¹⁴
- h. Aircraft operating surfaces – PTS at DIO and 12 (Air Sp) Engr Gp
- i. Airfield Navigation Aids – HQ AIR Aerospace Battle Managers

245. **Authority approvals process.** Some Authority Subject Matter Experts are required to give their formal approval prior to occupation and use of a facility, such as the Fire Officer or the Senior Ammunition Technical Officer. The Project Manager (see Chapter 4) must therefore make sure that those Subject Matter Experts give their early approval to any designs. This often requires those Subject Matter Experts to make an appropriate interpretation of the rules on which they base their decisions. Therefore the

¹⁴ JSP 403 *Handbook of Defence Land Ranges Safety*.

approval they give contains an element of subjective assessment. As projects take many months to complete, the in-theatre Subject Matter Experts are highly likely to have changed over before the work is completed. Therefore there is a risk that the new in-theatre Subject Matter Expert will disagree with their predecessor's design-stage approval and, at handover, refuse to give their approval to occupy and use. The use of a UK-based Subject Matter Expert to verify/endorse an in-theatre design-stage approval helps to mitigate this risk and is good practice, especially for large or high value projects. As a last resort, a risk-assessment-based, operational dispensation may be made to occupy and use the facility until final approval has been resolved.

Insight 2-10: Any in-theatre, design-stage, critical Authority Approval, such as that given by the Fire Officer and Ammunition Technical Officer, should be endorsed/verified by a UK-based Authority. It is good practice for the Project Manager to do this, especially on large or high value projects. This mitigates the risk at the handover of an in-theatre successor disagreeing with the original design-stage approval.

246. **Avoid under-estimating the requirement.** Avoid under-estimating the requirement as changes are difficult to accommodate.

a. **Plan for the base's capability.** By not considering the military capability required at a base, planners will usually under-estimate a Force's reliance on infrastructure. For example, they may assume that weapons and ammunition will be permanently held on vehicles or by personnel, however, a few months into the deployment, the requirement for a magazine and armoury will become apparent. Other facilities typically over-looked are: kitchen and refrigerated food storage, vehicle repair facilities, ranges, parking, entry control point facilities and communications masts. Similarly, planners will often give an arbitrary size of a camp or base determined largely on strategic considerations rather than a manpower estimate against task lines, for example, 'we need a 100-man base at this location'. This invariably leads to an under-estimate in base size.

b. **Consider the total population.** Furthermore, military planning is usually based on numbers of military personnel, and unfortunately civilians are often over-looked. Table 2.1 shows the relative numbers of civilian contractors that will work alongside a Force and is based on recent operational experience. To this should be added any MOD or Other Government Department (OGD) personnel.

Ser	Military	Contractors	Ratio	Remarks
(a)	(b)	(c)	(d)	(e)
1	4,200	2,400	1:1.75	530 UK-based contractors, 110 Third Country nationals, 790 Locally recruited workers
2	8,000	3,200	1:2.5	

Table 2.1 – Contractors as a proportion of the force

c. **Allow for surges.** The final calculation of size must allow for surge either during emergencies or during rotation. As a practical guide, bases should be capable of accommodating 125% of the design capacity for a limited period of time.

247. **Final check and then freeze the requirement.** It may often take some considerable time to complete the development of the requirement. The final draft of the requirement must be checked with the user/sponsor and other stakeholders. The requirement should then be frozen. This provides a clear aim for those who must then deliver it.

Insight 2-11: Write the requirement clearly, comprehensively and only once. Then resist the temptation to amend it.

248. **Changing the Requirement.** Occasionally it may become clear that the requirement was incomplete or has changed since project inception such that the facility will not be fit-for-purpose once completed. A judgement must then be made as to whether to change the requirement and alter the build in progress, or wait until project completion to make adjustments. Often the latter is better as it delivers the facility with the earliest possible initial operating capability, avoids contract disputes and keeps costs down. Most project delays can be attributed to user-instigated changes midway through construction and a lack of change control by the infrastructure staff. A value judgement must be made after seeking engineer advice. It is important that all parties must recognise that decisions made by the user that agreed the requirement at the start of a project, are binding on successors. If a change is required, the project engineer will obtain the cost and note it on a Variation Order (VO). Work on a Variation Order should not be undertaken without checking that there is adequate finance to cover any additional costs. A record must be kept of the reasons for any change in requirement.

Annex 2A – Example Infrastructure Request Proforma

Unit Ref:
Infra Task No:

Section 1: Statement of need (Note 1)							
Location		Type of facility					
Bldg name/No		User Unit					
Project Name							
POC:	Name	Rank	Appointment	Tel			
Description of Requirement (in terms of output or function) – <i>what?</i>							
Required Completion Date (ASAP is not acceptable see Note 2)							
Justification – <i>why?</i>							
Signed		Appointment					
Name		Rank	Date				
QM/G4 Staff Approval (Note 3)							
Signed		Appointment					
Name		Rank	Date				
Formation DCOS Approval							
Signed		Appointment					
Name		Rank	Date				
Formation Priority							

Infra/FM Staff use only from this point

Section 2: (DP1) Initial infra staff approval (Note 4)							
Received by:	Name	Rank	Date				
Action Taken		By whom		Date			
Initial J4 Infra Staff Approval or Reason for Rejection:							
Priority:	Immediate		Urgent		Routine		
	A1	A2	A3	B1	B2	C	D
Name				Rank		Date	

Section 3: Peer review (Note 5)				
J4 Infra Staff Approval to proceed to Detailed Design or Reason for Rejection:				
Name		Rank		Date

Section 4: Compliance (Note 6)									
Client		Fire		ATO		J6		J2	
EHT		Other						HN?	
Name						Rank		Date	

Section 5: (DP2) Funding approval				
Initial Financial Approval (Note 7)				
Report Ref:				
Authorised Limit-of-Liability:		£ / \$		
Authority:				
Name		Rank		Date
Financial Concurrence:		YES / NO		
Name		Rank		Date
Uplift Financial Approval (Note 8)				
Reason:				
Revised Limit-of-Liability:		£ / \$		
Authority:				
Name		Rank		Date
Financial Concurrence:		YES / NO		
Name		Rank		Date

Section 6: Tasking (Note 9)				
Tasked delivery organisation:				
Date Tasked:				
Requested completion date:				
Name		Rank		Date

Section 7: Completion (Note 10)				
Date handed over:				
Remarks:				
Name		Rank		Date

Notes

1. State requirement in terms of output or function required, not a description of the end product. Continue on separate sheets if required. Support your statement with reports, sketches and photographs, where appropriate. Provide a simple project name in no more than five words.
2. Give clear reasons for the target completion date in the justification. It must be a date not simply 'ASAP'.
3. The justification should include the operational penalties if the work is not carried out. Expand on reasons for target completion date. Once Section 1 has been completed in full, return the form to your QM for signature. (If a specific Estate Manager is appointed for the location of the work, they should give their concurrence also).
4. On receipt of the form, the infrastructure staff will assign a task number. The project may be rejected now (or indeed later); if so, a reason will be given. Otherwise a priority will be assigned to the project and initial work started. This relates to the *reconnaissance phase* of the task. Work may include the development of a detailed User Requirement Document, concept design and siting board. The requirement for long lead items may be identified. Typical entries in this Section might include, but are not limited to:
 - Request User Requirement Document (URD)
 - Request Options Study (Operational Infrastructure Recce Report)
 - Rewording required of original requirement.
 - Task rejected because...
 - Infrastructure Management Board's decision on likely delivery method.
5. In the case of more complex tasks, this section is used to give approval to proceed with the detailed development of the design. A Tactical Infrastructure Recce Report may have been produced; if so, it is referenced here. By this stage a cost estimate should be available. Infrastructure Staff prioritise the project according to the justification, taking into account the

feasibility of meeting the deadline. For simple projects, approval may be given concurrently with initial approval. It is possible, however, that the project may be rejected at this stage. This box must record the next action.

6. Before giving financial approval, the infrastructure staff must make sure that all stakeholders (including the originator of the request: the 'client') review the design and detailed delivery proposals to make sure that they will deliver a solution that will meet the requirement. Other compliances must also be confirmed. If host nation approval is required, the process of obtaining it may need to start as soon as the request for construction is received.

7. The Infrastructure Staff give financial approval only once they have adequate confidence in the estimated cost. If this is based on a report, give its reference. The *authority* for this approval is either the named individual with powers of financial delegation, or the reference of the PJHQ letter of financial approval. Limit-of-liability includes cost and an allowance for contingencies. Care must be taken to make sure that the total sum being authorised is within the approving officer's delegation; novel and contentious projects negate any delegation. The Civil Secretary is then asked to give their concurrence.

8. If an uplift is later required, the Civil Secretary's concurrence must again be sought. A reason for the uplift should be given.

9. Section 6 is used to task the delivery of the final Works solution. It may be the Infrastructure Support Provider, another contractor (through a Works Contract Officer), or the Military Construction Force (through the JFEngr). This may be determined from the outset by the Infrastructure Staff or through the Infrastructure Management Board.

10. The handover date and record of the handover board should be referenced. This form is then closed and archived for audit purposes.

Annex 2B – Infrastructure and operational planning horizons

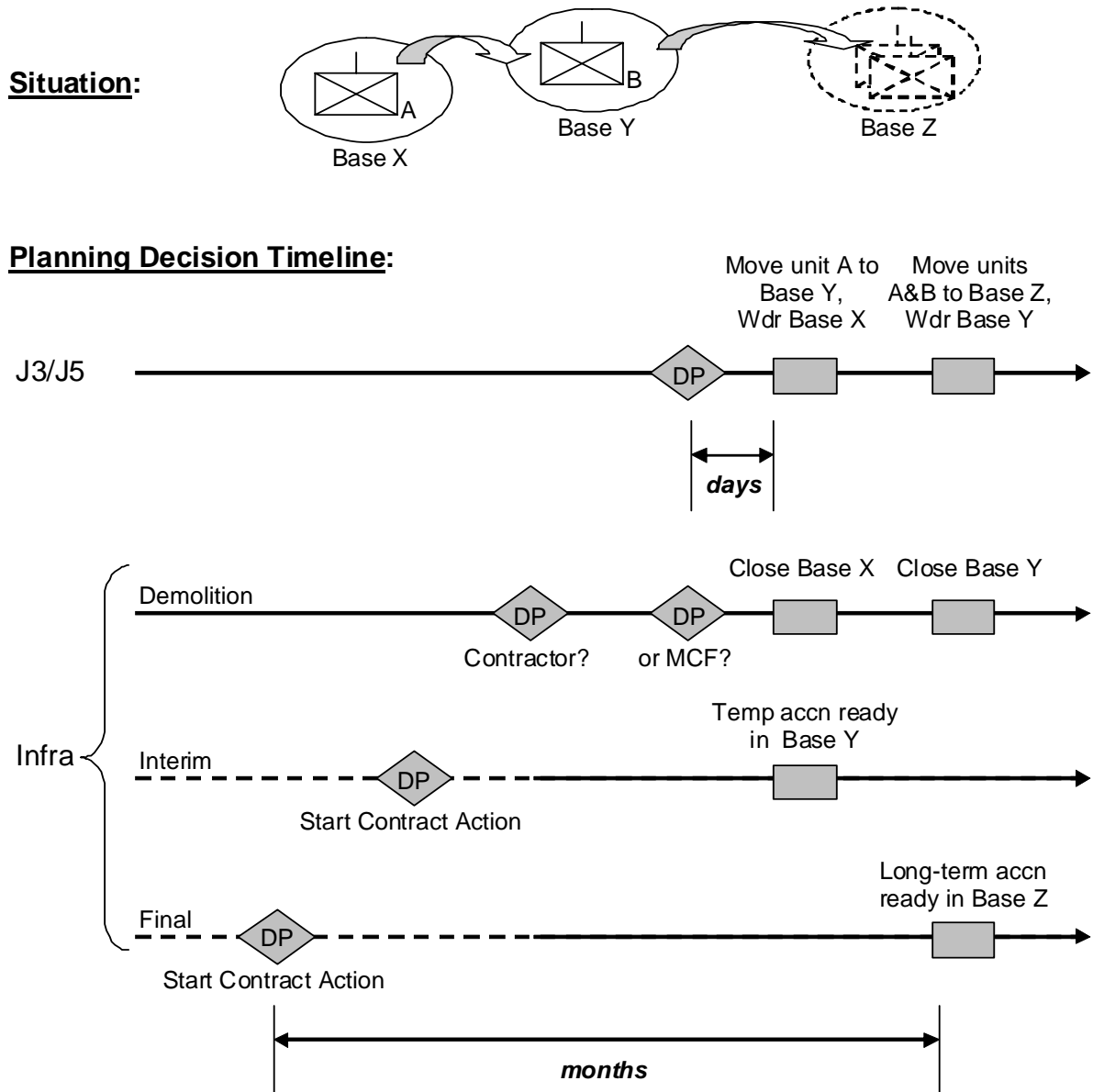


Figure 2B.1 – Example of the mis-match of J3/J5 and infrastructure planning horizons

Annex 2C – Infrastructure development directives and plans

2C1. Purpose of the Theatre Infrastructure Development Directive.

The Theatre Infrastructure Development Directive (TIDD) is used to direct the overall development of the operational estate within a specific joint operations area. It establishes the planning horizon, sets standards for provision of infrastructure, addresses strategic campaign themes such as Theatre entry and withdrawal and, critically, estimates the overall financial cost of development. The TIDD sets priorities, standards, constraints, freedoms and planning goals all within the wider context of a J4 operational plan. Agreed at 1-star level within PJHQ and by Command Sec (ACOS J8), it gives context to the various business cases that come from Theatre. Once agreed, it forms part of the Theatre Reference Document (TRD) for an operation.

2C2. Contents of a Theatre Infrastructure Development Directive. The size and contents of the TIDD will vary over time. As a guide it should address:

- a. **Infrastructure support to the operation.** The TIDD should explain what infrastructure is required to support the operation, for example, an 'RSOI camp for 5,000', an 'APOD for Sp Ac and 24 Typhoon aircraft', or 'up to 20 company-sized patrol bases'.
- b. **Planning horizon.** The TIDD should give the planning horizon for infrastructure investments throughout theatre. Ideally, some estimate should be given of the likely tenure of each site and major facility; are they likely to be needed for a short term (less than say six months) or longer term (say up to two years)?
- c. **Infrastructure programme.** It should state who is responsible for producing the Infrastructure Programme.
- d. **Protection.** It should state what facilities should have physical protection incorporated into them and to what level. An overall prioritisation should be given, for example, dining facilities and other areas where a single attack may lead to mass casualties. Whilst protection levels are J3 led, the TIDD may give guidance on what that

means for the operational estate, such as, 'fitted for but with compartmentalisation'.

- e. **Finance.** It may contain an overall forecast of the cost of infrastructure support, both for new work and maintenance. Endorsement of the TIDD does not grant financial endorsement, it merely serves to help identify the full cost of planned work. Nevertheless, it forms the basis on which subsequent detailed business cases may be formed. The TIDD allows finance officers to see the full scale of financial commitment that a single business case will not address.
- f. **Equipment infrastructure.** The TIDD should provide policy on the use or withdrawal of equipment infrastructure.
- g. **Standards and scales.** The TIDD should give some guidance on the technical standards to be adopted and the scales of accommodation (if other than detailed in this JTTP). It may also give further guidance on meeting the Minimum Military Requirement (MMR).
- h. **Health and Safety.** The TIDD may need to give some clarification of the health and safety procedures to be adopted. It may also remind theatre to confirm its infrastructure safety Standard Operating Procedures (SOPs) with PJHQ. Further details are in Part 3.
- i. **Military works area.** The TIDD should clarify whether a military works area exists and, if so, its boundaries.
- j. **Lands and environmental issues.** Guidance may be given on the selection of base locations, condition surveys, leasing and environmental assessments, if appropriate.

2C3. **Review and endorsement of the Theatre Infrastructure**

Development Directive. The TIDD is kept under constant review and is re-issued on a periodic basis. Each time it is endorsed by PJHQ's Ops Board, the formal decision-making body within the headquarters.

2C4. Sustainability Statement. Iterative analysis of demand produces progressively more accurate estimates upon which is based the Sustainability Statement, a part of the logistic plan. The Statement gives direction to staff planners and those who allocate resources on what needs to be stored, delivered, and by when. The Sustainability Statement provides the authority for the release and commitment of finance and materiel. The TIDD both draws on the Sustainability Statement and informs it. The two documents are developed in tandem.

2C5. Infrastructure Development Plans. Using the TIDD as a basis, site-specific Infrastructure Development Plans (IDPs) are drawn up by theatre infrastructure staff. These Infrastructure Development Plans should be specifically endorsed by PJHQ. They, in turn, feedback into and shape the TIDD through the Infrastructure Programme. The Infrastructure Development Plans give detail to the operational and tactical infrastructure requirements. These too are living documents. It is therefore strongly advised that they are not verbose and lengthy if they are to be issued in a timely manner and remain useful to the UK Armed Force's planners. They must remain usable and informative; short, readily amendable plans are needed. They provide continuity of purpose for Theatre infrastructure staff and give planners a framework within which to work.

2C6. Contents of an Infrastructure Development Plan. Any appropriate format may be used, however, the Infrastructure Development Plan should contain:

- a. **Description of the estate.** An Infrastructure Development Plan should start with a brief outline of the role and function of the site and a list of the components of the UK's operational estate.
- b. **Ownership.** It is important to state clearly the boundaries of UK responsibility (delineate the operational estate). Therefore an Infrastructure Development Plan should clarify ownership of the land and each infrastructure element of the estate. It should establish who is responsible for its provision, operation, maintenance and repair.
- c. **Planning horizon.** Give the working assumption of the likely tenure of the site, derived from the TIDD and adjusted by local plans.

d. **Planned development work.** The Infrastructure Development Plan should show, normally in the form of a small number of site plans, how the site is planned to develop over time. This pictorial representation of planned development should be supported by a list of the major projects planned, giving an estimate of time and cost.

2C7. Review and endorsement of the Infrastructure Development Plan.

As with the TIDD, Infrastructure Development Plans should be kept under constant review and be re-issued on a periodic basis. Infrastructure Development Plans should be endorsed by PJHQ. Each iteration helps shape the next TIDD.

Annex 2D – Scale and standard of provision

2D1. **Scaling.** The provisions of any scaling are not an entitlement; they are a planning guide. Scaling for facilities should be to JSP 315,¹ Scale 5, *Training Camps and Transit Accommodation*. However, military judgement should be applied to its interpretation. QSTAG 1176² should be considered as *supplementary* guidance to JSP 315; JSP 315, however, takes precedence.

2D2. **Standard.** The standard of water and other services required is detailed in other UK, 4-series Joint Doctrine Publications (JDPs). There is also further NATO guidance in:

- STANAG 2136, *Water Quality Standards*
- STANAG 2280, *Classification of Field Fortifications and Deployable Protective Structures*
- STANAG 2882, *Field Sanitation*
- STANAG 2885, *Emergency Supply of Water*
- STANAG 4133, *Electrical Power Generation*

2D3. **Efficiency of occupation.** Allowance may be made for single occupancy for senior officers/VIPs and inefficiencies due to gender segregation. However, an over-generous allocation is not minimum military requirement. Table 2D.1 gives the planning guidance for the provision of new domestic facilities.

2D4. **Variations.** The Tactical Infrastructure Recce Report will explicitly state whether any variations are permitted from those laid out in this document.

¹ Edition 3/July 1999 Amendment No 3/November 2000 – or a more recent edition.

² Quadripartite Standardisation Agreement No 1176 Edition 1, *Minimum Standards for the Provision of Short Term Camps*, 2 December 1997.

Ser	Personnel	Occupancy
(a)	(b)	(c)
1	Junior ranks	4 personnel
2	Senior ranks	4-2 personnel
3	Junior officers	4-2 personnel
4	Senior officers	1-2 personnel
5	Command appointments	Single rooms

Table 2D.1 – Planning guidelines for the provision of new domestic facilities

Chapter 3 – Components of the operational estate

Section 1 – Operational bases and camps

301. **Main and tactical bases.** A deployed force operates out of *static* locations in the Joint Operations Area (JOA).¹ These operational bases can be considered as being of two types: main bases and tactical bases. Operational bases have infrastructure designed to support the function of the base and the operational role of units deployed within it. In this context, therefore, the term ‘camp’ relates only to the domestic facilities needed to support personnel. The infrastructure required in a base is, almost always, far greater than the aggregate of its camps. A detailed, although not exhaustive, list is provided at Annex 3A. Table 3.1 compares the relative characteristics of main and tactical bases. Figure 3.1 shows how main and tactical bases integrate into the generic concept of operations.

Ser	Main base	Tactical base
(a)	(b)	(c)
1	Large Joint, multi-unit location which may include formation HQ(s).	Variable in size, but usually smaller than a main base.
2	Command and logistics centre, although may also be the base for some operations, especially air and aviation.	Operating location including appropriate levels of command.
3	Long-term tenure anticipated relative to campaign length.	Typically shorter-term tenure, or greater uncertainty of duration.

¹ Even if the UK Armed Forces are accommodated and supported from the sea, it is most likely that some static, physical locations are needed on land at some point in the Operation.

Ser	Main base	Tactical base
(a)	(b)	(c)
4	Personnel remain in the same location for extended tour (more than six months).	Occupation by individuals <i>may</i> be very short-term as they rotate through the most exposed locations. Nevertheless, some may conduct a full tour in a tactical base (six months).
5	May be used as a rest/recovery area for personnel operating in more exposed/austere tactical bases.	Environment typically more austere than a main base.
6	Generally out of regular direct combat with the adversary, but may be subject to indirect fire or Vehicle Borne Improvised Explosive Device (VBIED) attack.	Can be in frequent direct combat with the adversary.
7	Access to strategic transport and communications.	Limited access to operational and tactical transport (including helicopters) and communications.
8	Wide range of contractors able to work routinely without incurring significant risk.	Contractors often unable/unwilling to work routinely in these locations.

Table 3.1 – Typical characteristics of main and tactical bases

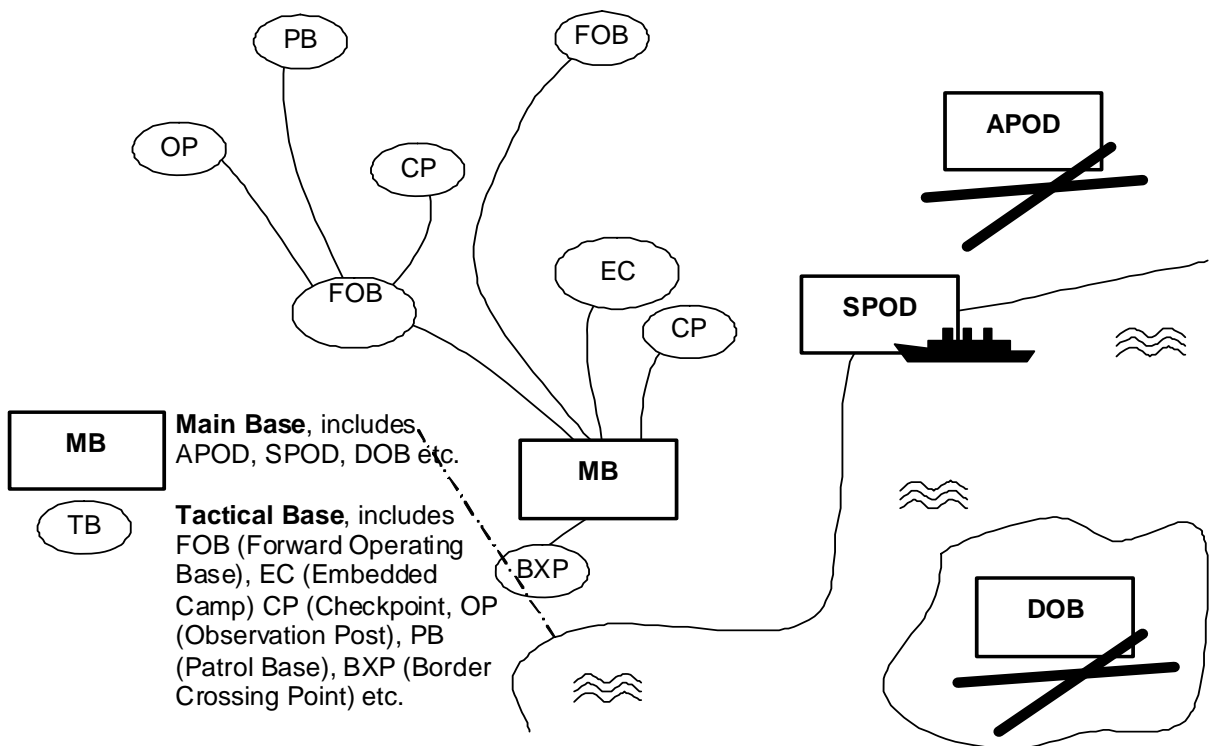


Figure 3.1 – Operational bases

302. **Main base.** A main base is a large, complex, *static* location the position of which is determined by strategic or operational considerations such as theatre entry, campaign support and air operations. It is likely to have a large contingents of allied forces and non-military organisations.

303. **Tactical base.** A tactical base is a *static* location the position of which is primarily influenced by tactical considerations such as the need to dominate key terrain, vital ground² or provide logistic support to combat operations. It is used by our Forces³ as a base to support tactical/local operations; therefore tactical and logistic considerations determine its location. Whether the tactical base is called a Forward Operating Base (FOB) or patrol base, will be determined by function and does not necessarily correspond to how well developed or mature its infrastructure may be. Tactical bases are addressed in more detail in Section 5.

² The ground may be vital either by the physical advantage it gives through terrain, or for political/presentational reasons, particularly those linked to the local populace.

³ And possibly those of our allies and partners.

304. **Location.** The location of any base is determined by the appropriate military commander. The commander should draw on the advice of specialists when making this decision, for example, medical, communications, logistics, fires, and engineers. Theatre will confirm the location of every *static* location with PJHQ in order to ensure visibility of the entire operational estate and bound the liability for logistic support associated with it.

305. **Authority to occupy a location.** Before taking over a facility, building or land on which to build a base, its ownership must first be established. Government owned property is used in preference to privately owned property. This usually makes it simpler to establish unchallenged authority to occupy the site. Unless it is undisputedly the property of the host nation's government, establishing ownership is often difficult and time consuming. Only the Defence Lands Agent within the Defence Infrastructure Organisation has the authority to enter into leases on behalf of the MOD. This authority is not routinely delegated to individuals in theatre. JTTP 4-05.2 *Lands and Environmental Procedures* explains how and under what authority the MOD will occupy sites on the operational estate. It also explains what to do when operational circumstances make it impractical to deploy the Defence Lands Agent. As a minimum, a photographic record before occupation is required.

Insight 3-1: Make a note of the existing *baseline*, damage and environmental conditions of a location as soon as possible. Obtain a formal agreement to occupy *before* making any significant investment in infrastructure.

306. **Control of real estate.** The responsibility for, and control of, all parts of the operational estate must be clearly stated in the relevant site-specific Infrastructure Development Plan. This can be complex on shared bases. For that reason it is often best to establish a lead nation in whom this control is vested. No new facility, building or, indeed, change of land-use should be permitted on a base without the approval of the UK Armed Force's Infrastructure Staff.

307. **Naming.** Each base must have a unique designation: a name and/or number. Once chosen, this should not be changed. Changing the name causes confusion in theatre and can be particularly problematic for after-

action reviews, boards of inquiry or financial audits conducted many months or, indeed, years later. Often ownership of a tactical base will be transferred to local forces as the campaign progresses. Therefore with this long-term objective in mind, it may be advisable to name a base, from the outset, using the local language or naming convention.

Insight 3-2: Carefully select the name of a base and then do not change it to avoid confusion and maintain traceability.

308. **Handover or closure.** Ideally there should be a clear plan for the disposal of every base. However, this is rarely possible in practice. Nevertheless, the infrastructure that is developed at a base must take into account the departure of UK Forces from the base and disposal/recovery of its infrastructure. Sometimes a base may be closed outright,⁴ however, transfer to another Force is also likely. Issues that must be considered are:

- a. **Loss of equipment.** Equipment infrastructure may need to stay in place in order to make sure that a base can continue to function. Whether through gifting or sale, equipment may be lost, the cost of which may or may not be recovered. Alternatively, infrastructure may be constructed to a form and standard that may be maintained by a follow-on Force; or it may be rented and the follow-on-Force may be assigned the contract.
- b. **Remediation.** It is usual practice to make sure our Forces leave a location in good order. This includes an assessment of any remediation that may be needed. This is covered in Part 3.
- c. **Post-occupation survey.** At, or before, closure a post-occupation survey must be completed and the Defence Lands Agent consulted. Again, as a minimum, a detailed photographic record must be completed.

⁴ Triumphant 'occupation' of a former UK base by a hostile force should be avoided.

Section 2 – Categories of infrastructure

Entry points and lines-of-communication

309. **Entry points.** By their nature, Theatre entry points and lines of communication have not just operational, but strategic importance. It is highly likely that host nation or coalition interest in them may be high. It is possible that the deployed Force may be required, albeit in a limited capacity, to repair and operate existing facilities.

a. **Sea ports of disembarkation.** Marine and maritime operations may be supported for a short time only, by over-the-beach facilities using specialist equipment. However, a seaport provides a significantly greater degree of flexibility and logistic capacity. Harbours and port facilities can take years to develop. It is highly likely therefore that use will be made of existing ports to support an operation rather than build a new one. Nevertheless, additional facilities may be required at a port either for ship-to-shore transfer or to store materiel prior to transit. Port infrastructure is generally large, heavy and requires specialist design and manufacture in order to cope with the high loads and damaging environment.⁵ This can be very time consuming. A key requirement during early planning for an operation will be to confirm that any intended Sea Port of Disembarkation (SPOD) has the requisite handling facilities. Often older ports will have cranes designed to off-load cargo from inside the holds of ships. More modern ports are designed around bulk container handling. Military operations are likely to require roll-on, roll-off (Ro-Ro) facilities. Unfortunately, these are not commonplace in ports worldwide. A deployed force may therefore need to repair and develop indigenous facilities. Annex 3B gives more detail on the requirement for infrastructure to support marine and maritime operations.

b. **Air ports of disembarkation and deployed operating bases.** A Deployed Operating Base (DOB) is an airbase from which air or aviation operations are mounted. An Air Port of Disembarkation (APOD) may also be a DOB; the difference between the two is the

⁵ Exposed shorelines experience high winds, corrosive salt spray and wave damage.

requirement to transit large numbers of personnel and materiel. An air port of disembarkation may therefore also have passenger handling and Reception, Staging, Onward movement and Integration (RSOI) facilities, freight handling and storage areas, and an *aeromed* facility.⁶

- (1) **Category of airbase.** The infrastructure of an airbase is categorised in terms of the availability of critical facilities. The table at Annex 3C shows how airbases are categorised as: well-found, austere or bare. Assessments, although shown as numeric, are often subjective. Whether bare or well-found, the facilities at an airbase may need improvement.
- (2) **Repair and maintenance.** Along with conducting routine maintenance, those organisations that support the infrastructure of an airbase must be capable of the Restoration of Essential Services and Facilities (RESF) and the Repair of Aircraft Operating Surfaces (RAOS), including Airfield Damage Repair (ADR), following an attack.
- (3) **Air and aviation.** When operating from the same deployed operating base, air and aviation assets can share most of the same facilities. However, for safety reasons their AOS are usually kept apart. HQ Joint Helicopter Command (JHC) does not have the same degree of integral infrastructure support enjoyed by HQ AIR. Therefore the provision of infrastructure support to aviation assets will be carefully considered when they are deployed outwith the support envelope given to Air assets.

310. **Lines of communication.** The Main Supply Routes (MSR) in a joint operations area are almost always those elements of indigenous infrastructure for which a Force may have some responsibility to maintain, if not build. The responsibility for the maintenance of main supply routes within a joint operations area must be unambiguously determined from the outset.

- a. **Roads.** Typical tasks have included resurfacing to allow heavier vehicles and a greater volume of traffic, building bypasses to avoid vulnerable points, repair of culverts and running surfaces, and

⁶ An *aeromed* facility is a medical facility where patients are stabilised and prepared for air evacuation.

snow/ice clearance. The logistic traffic required to support a military operation will undoubtedly have a damaging effect on any local roads. Tracked vehicles in particular should be kept off all but the most robust routes if those routes are also expected to carry wheeled vehicles. Road-based main supply routes will remain a Force's mainstay; the deployed Force therefore needs the ability to safeguard their functionality.

b. **Surfacing materials.** Expedient surfacing equipment such as trackway and matting is very expensive and impossible to secure against theft. Its use should be limited to road traffic surfaces in battlefield infrastructure, or for air and aviation operating surfaces. Alternative, construction-based solutions will be needed employing, either using an unbound⁷ or other appropriate pavement⁸ material.

c. **Bridges and other crossings.** Whether authorised or not, the use of an unguarded main supply routes by civilian traffic must be assumed and crossings designed accordingly. Civilian traffic is much less regulated than military traffic: drivers may be travelling too fast or axle weights may be too heavy for the route. Damage is highly likely unless specific precautionary measures are taken, such as the use of weighbridges and traffic slowing features. Some existing military equipment bridges, intended for the battlefield environment, have steep ramps and no side rails. Their uncontrolled use by civilian traffic is not prudent. Equipment bridges are designed to be readily assembled and stripped-out on site. This makes them vulnerable to theft. More alarmingly, bracing or other hidden components may be removed, thereby reducing the capacity of the bridge, resulting in either damage or collapse under load. Both equipment and constructed bridges are likely to be required.⁹

d. **Convoy support centres.** Sited at border crossing points or other strategic locations, Convoy Support Centres enable the use of a main supply route. While they may be based on a site with indigenous

⁷ Unbound surfacings are formed of compacted aggregate.

⁸ Concrete or blacktop (bitumen-based).

⁹ Bridges are often vulnerable points; therefore their use in a non-benign environment should be avoided if practicable. Alternatively, the use of fords and Irish bridges may be more appropriate. These are constructed solutions.

infrastructure, it is highly likely that this must be augmented with additional infrastructure support.

e. **Rail.** Although less flexible, railways offer greater capacity and so logistic resupply may consider the use of rail as a main supply route. This may also be linked to the reconstruction and development of the local economy. Whether to support the UK Armed Forces or help redevelop the host nation as part of stabilisation, the deployed Force may be called upon to repair damage and advise on future development of the rail network.

Facilities

311. **Tiered solutions.** Infrastructure facilities, particularly accommodation, can be described as having a 'Tiered' series of options. The principal consideration for the selection of a Tier is the capability it provides, not how long the actual structures themselves will last. Therefore definitions of each Tier are not couched in terms of *permanence* or by the duration of its occupancy, but rather by the capability it provides (such as, speed of provision, comfort, durability, maintenance burden, and level of protection). For example, a concrete Tier 3 structure may be adopted because it gives a higher level of protection than that afforded by a cabin-based Tier 2 facility. There is no requirement for an operation to progress through the different tiers. Instead the most appropriate solution is chosen on a case-by-case basis. Annex 3D details how Tiers are defined.

312. **Equipment components and configured solutions.** Equipment infrastructure facilities such as camps are comprised of many components, for example, tents, trackway, ablutions, and storage. For planning simplicity these are best considered as configured assets, such as, 'a 600-man camp'. However, this produces solutions that are too large for most requirements in theatre, for example, the unit offices and accommodation for a 25-man detachment. Equipment infrastructure facilities must therefore be made available as both configured solutions and as individual components, and remain manageable as such in theatre.

Insight 3-3: The physical components of a facility can be used to support more than one function; a tent can be for accommodation, hospital, headquarters or workshop: the metal planks with a length of trackway are the same as those in an airfield repair mat.

313. **Domestic facilities.** Domestic facilities comprises of many components, such as, sleeping accommodation, kitchens and dining facilities, ablutions, laundry, gymnasium, welfare, unit stores and administrative facilities. Over time, a higher standard and more generous scaling may be required; however, this does not necessarily require Tier 2 or 3 facilities.

314. **Offices and headquarters facilities.** Office facilities are needed to support headquarters and units. These integrate with domestic facilities and may include the same, or similar, structures. However, the need to optimise for mobility to support manoeuvre units means that some headquarters infrastructure may not be appropriate for enduring use.

315. **Medical infrastructure.** To support our deployed medical capability we need facilities capable of operating as close to the point of wounding as possible. Categorisation of a facility by its medical role is used. These facilities must be built around infection control and must have the range of *plug-and-play* component capabilities needed to support the population at risk (for example, operating theatre, CT-scanner, isolation ward, dental, and primary health care). Requirement capture and change control is a closely managed function. Whilst maximum use is made of template hospital design solutions, these must invariably be adjusted to suit the demands of any specific operation. See Annex 3F.

316. **Equipment support.** Equipment repair and maintenance is more efficiently conducted in purpose-built facilities. These may be simple 'sheds' with robust flooring, or it may require the incorporation of more complex facilities such as air-conditioning, dust exclusion, fume extraction and overhead cranes. Large open plan structures form the basis of this infrastructure. Facilities for land-based and air-based equipment are likely to be very similar, except air facilities generally need access for wider and taller equipments.

317. **Logistic support.** Most materiel can be stored in the open, in which case all that is required is the running surface on which to operate MHE. However, most materiel also lasts longer when given shelter from the environment. Indeed, some materiel needs environmentally controlled storage (for example, drugs and some ammunition natures). Infrastructure therefore is needed to provide security, resilience and to reduce stock wastage. The provision of adequate storage facilities is closely linked to the Logistic Estimate and Sustainability Statement for the UK Armed Forces.

318. **Welfare.** Even for operations of short duration, welfare facilities are required. This can vary from a restroom to an internet café. The NAAFI¹⁰ provides a valuable service on operations, see Annex 3G. However, not all welfare facilities are provided and funded by the UK MOD. Some voluntary organisations and franchise operators may also be encouraged to operate within a base. The degree of infrastructure support given to them, and whether they are charged for it, varies on a case-by-case basis. Whatever arrangement is adopted, we must be able to make sure that their facilities are safe for our personnel to use. Whatever physical infrastructure is used, service personnel must make sure it is safe by setting standards and monitoring compliance.

319. **In-theatre training facilities.** Infrastructure is required to support training in-theatre both for RSOI *and* mission rehearsal. This includes, but is not limited to:

- (a) **Weapon ranges.** Ranges are needed for periodic re-qualification and zeroing of weapons.
- (b) **Search.** Unit and specialist search facilities.
- (c) **Driver training.** Driver training areas to practise the skills required in the local environment.
- (d) **Classrooms and learning centre.** UK Armed Forces may also require learning facilities in order to sustain the ongoing education of personnel when deployed.

¹⁰ Navy, Army and Air Force Institutes

Utilities

320. **Utilities.** Infrastructure is used to obtain, process, store and distribute the utility commodities of electrical power, water and fuel. Operational pressures will make the deployed Force constantly seek to improve the efficiency with which these utilities are managed. Critical to this is data capture and processing. Power demand, fuel and water usage must be measured in a comprehensive and detailed way to allow service personnel to husband resources better and reduce the logistic burden.

a. **Electrical power.** Electrical power is increasingly in demand for emerging military capabilities. Service personnel need to generate power efficiently, then store and distribute it intelligently. Static locations may use equipment infrastructure or some other solution, if appropriate. To deliver efficiencies, all of the UK Armed Force's equipment systems operating routinely in a static location should be capable of connecting to the site's power supply rather than running their own generator.

b. **Water.** Water must be sourced as close to the point of use as practicable in order to reduce the logistic burden. The ability to abstract it from a variety of sources – groundwater, surface lakes and rivers, saline estuaries and the sea – is essential.¹¹ To make use of locally sourced water, service personnel must be able to treat and test it prior to use. Only a small proportion of the water required is ever ingested. Nevertheless, there is only one water quality standard for the *supply* of water; it is defined in Joint Warfare Publication (JWP) 4-01.1. Drinking water must be palatable and have a high degree of surety in the quality at the point of consumption. Whilst infrastructure provides part of the solution, the key to achieving efficiency lies with the in-theatre management regime and the availability of sterile containers at unit and individual level. For this reason our water supply system must be considered as a whole.

c. **Fuel.** Infrastructure is needed to transfer fuel from strategic transport, store it safely, test its quality and issue it for use. This

¹¹ Only exceptionally will we require grey-water to be recycled for drinking. It does, however, have wider use.

includes ship-to-shore and pipelines as well as tactical fuel-handling facilities.

d. **Waste management.** Infrastructure is also required to support the waste management plan of an operation. At static locations waste¹² may have to be burnt safely. This may include ammunition packaging and clinical waste.

Section 3 – Equipment infrastructure

321. **Principles of use.** Equipment infrastructure provides PJHQ and the deployed Force, with a range of possible solutions to meet a broad set of possible requirements: a golf bag of capabilities. In order to do this, equipment infrastructure is designed to meet the following two principles:

a. **Optimised for mobile use.** Held at readiness, equipment infrastructure provides most of the early elements of the operational estate and so is optimised for *mobile* use as explained in Chapter 1.

b. **Capable of prolonged use.** Equipment infrastructure may have to be operated for prolonged periods in *static* locations. The most challenging environment in this context is in the static, tactical bases. Only in this secondary role, assigned to a location rather than a unit, is its use controlled as an item of infrastructure.

322. **Unit-organic and centralised equipment.** Some equipment is designed specifically to be held and operated by non-infrastructure specialists: unit-organic equipment. Other equipment is primarily intended for static locations and is held centrally. These two categories are not mutually exclusive and there is often an overlap, as shown in Figure 3.2. Sometimes equipment held by a unit may become incorporated into a static location and be, in effect, centrally held. The UK Armed Force's asset tracking and control procedures must take this into account. The diagram also shows how some Tier 2 facilities¹³ may be managed as equipment infrastructure.

¹² This may include the waste from toilets in order to avoid the need for chemical latrines, and it may also facilitate the recycling of some water.

¹³ Particularly any high value, re-usable items such as the cabins in which CT scanners are installed in hospitals.

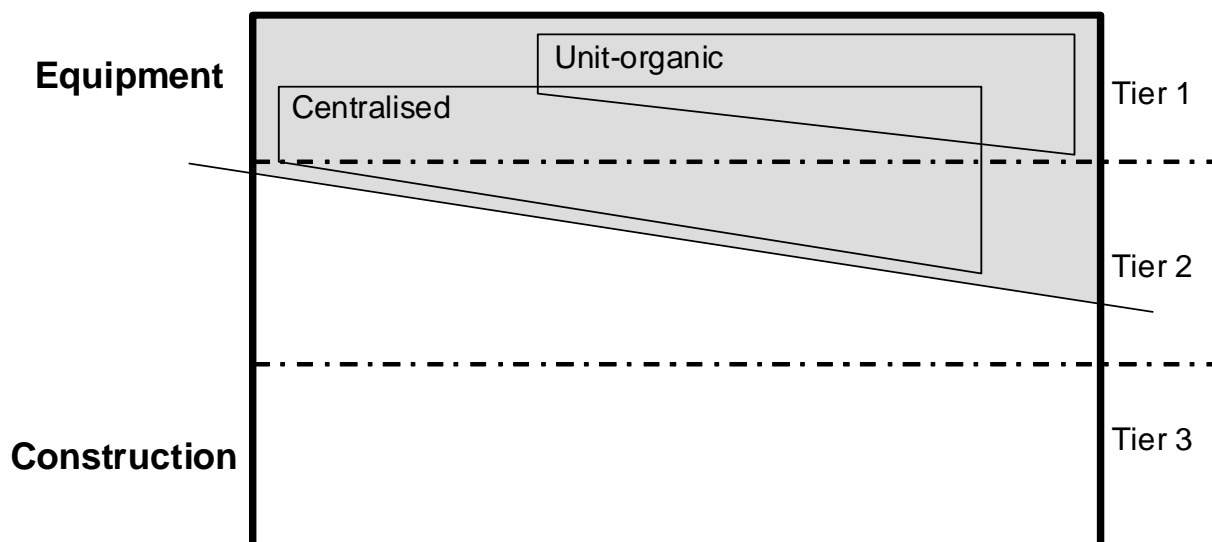


Figure 3.2 – Unit-organic and centralised equipment

323. **Releasing equipment to the theatre.** Units may deploy with their own organic infrastructure (that which is held on their unit equipment tables). Any additional equipment, and any that is held centrally, must be requested through the normal Additional Resource Bid (ARB) process. The DE&S equipment manager must obtain PJHQ’s specific authority to release equipment infrastructure to theatre. Some items of equipment may be held in theatre but not released for use (for example, items in the JSC held on a *Charlie Alpha* account or *entrusted stock* held by a contractor). Specific authority must be obtained by theatre before they may use these items.

324. **Equipment capability.** The MOD’s Through Life Capability Management (TLCM) processes make sure that all ‘equipment’ is developed as a capability, that is to say that the required training, doctrine, organisation, logistics and other Defence Lines of Developments (DLODs)¹⁴ are put in place. A UK-based Capability Integration Working Group (CIWG) brings these DLODs together. Equipment is obtained through two sources of funding. These affect infrastructure planning as follows:

- a. **Equipment Programme funded.** The long-term Equipment Programme (EP) is the normal source of funding and is controlled by a Capability Sponsor, as explained in Chapter 1. Support and training

¹⁴ Training, Equipment, People, Infrastructure, Doctrine, Organisation, Information, Logistics and Integration.

are embedded into normal business. An equipment manager is appointed in DE&S to look after the equipment throughout its in-service life. The equipment manager may have funding available to carry out improvements and modifications to the equipment. Coordination with the DE&S may therefore improve the operational estate without the need for PJHQ or theatre to produce business cases.

b. **Urgent Operational Requirement funded.** The Urgent Operational Requirement (UOR) process obtains equipment, and is funded through NACMO (see Part 4). The Equipment Capability (EC) desks in theatre and at PJHQ control this process. A UK-based CIWG will make sure that training and immediate support are provided along with the equipment. However, these are only temporary solutions. The support solution in particular, may only have enough spares or materials for a limited duration. Additional items cannot simply be 'ordered'.

325. **What to do when equipment infrastructure is not enough.** Often there may not be enough equipment infrastructure. There are a number of options available to resolve this:

a. **Not enough of an in-service equipment programme funded equipment item in theatre.** If there is not enough equipment, more may be obtained through an additional resource bid process as explained above.

b. **Not enough of a Urgent Operational Requirement funded equipment item in theatre.** A new business case must be raised by the equipment capability desk.

c. **The MOD has no more items left of that particular equipment.** If more items of a specific piece of equipment programme-funded equipment are needed *for a specific project*, than is held by the MOD, it may still be possible to obtain more through the Equipment Manager. The project business case will need to take the additional cost of purchase into account and Financial Authorisation given to

DE&S by PJHQ. Advice must be sought from DE&S before planning to follow this option.

d. **There is no available equipment that can do the job.** If the current range of equipment infrastructure cannot meet a specific performance criteria there are two options. In both cases a User Statement of Requirement (USUR) is needed.

(1) **Obtain through Urgent Operational Requirement.** As explained earlier, the equipment capability desks control this process. However, this can be time consuming and the focus of the process is the item of equipment, not the project. This can cause integration problems when that item is required to be incorporated into a specific project.

(2) **Purchase as an item of infrastructure.** The item may be obtained through the normal infrastructure procurement process. This is often quicker than the urgent operational requirement process. Items such as generators and fabric shelters may be obtained; however, they must be intended for incorporation into a specific construction project, such as a presumption of no-return. One of the reasons for the speediness of this process is that it cuts out work on the Capability DLODs. There is no CIWG to make sure that soldiers are trained to assemble and operate it nor that a support system is in place. Therefore, if for example a series of non-standard borehole pumps are obtained for tactical bases, PJHQ and theatre must make sure that training or other DLODs are addressed in some way.

326. **Compendium of equipment infrastructure.** A list of the available equipment programme-funded equipment infrastructure can be found in JTTP 4.05-1 *Compendium of Equipment Infrastructure*.

327. **When it matters what type of equipment is used.** If any equipment may be expected to have to operate in a non-benign environment, military personnel must be trained in the use of that *specific* equipment. These are likely to be non-specialist personnel. Therefore it needs to be obtained through Contracting for Availability. This is to make sure personnel are familiar with

the actual equipment they will use. If, however, that equipment is not expected to deploy to those areas, and is most likely to be operated by *skilled* contractors, we may obtain it through Contracting for Capability. In this instance we will rely on generic infrastructure training and site-specific familiarisation, should we need to use military personnel to operate it

328. **Equipment maintenance.** The required maintenance of an item of equipment is described in its relevant AESP.¹⁵ This maintenance regimen is appropriate for its use in mobile operations and harsh environments. However, when used in a static, infrastructure role over prolonged periods, it is often appropriate to modify this regimen.

Section 4 – Protective infrastructure

329. **Protection from hazards and threats.** Force Protection Engineering (FPE)¹⁶ is the term used to describe the infrastructure work that is undertaken to protect a deployed Force from:

- a. **Adversarial threat.** This is the threat from an enemy intent on causing harm.
- b. **Occupational hazards.** These are the dangers to service personnel from its own activities such as from ammunition storage. An occupational hazard has the capacity to cause harm, but not the intent.
- c. **Environmental hazards.** These are the potential hazards of the local environment.

330. **Protection of facilities.** In order to minimise deployment time and to provide a flexible response to the actual level of threat faced, the deployed Force needs to be able to adjust the level of protection within infrastructure facilities. Providing perimeter integrity is maintained, the principal threat is from indirect fire (IDF). Protection is characterised as having three levels. These are matched to the time, cost and effort required to create the desired protective effect. These levels are described in Annex 3E. In order to make

¹⁵ *Army Engineering Support Publication*

¹⁶ JDP 3-64.1 *Force Protection Engineering*.

use of them at any particular location, the design threat weapon must be specified along with the required protection level.

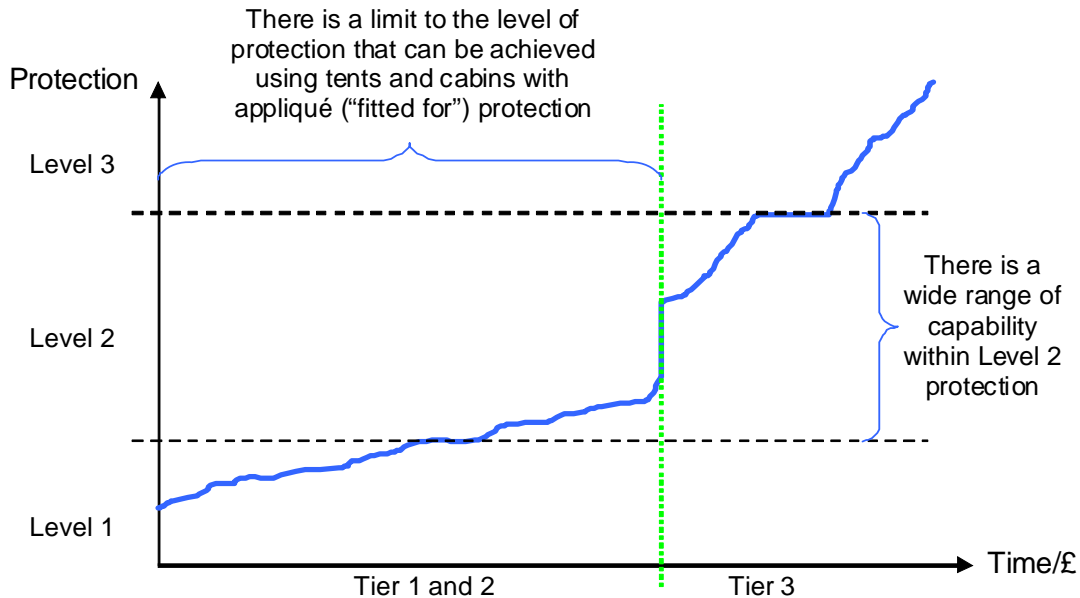


Figure 3.3 – Levels of protection matched to tiered facilities

331. **Security and protection.** Some form of perimeter security and entry control will be an essential early form of protection. This will include protected guard positions, vehicle and personnel search facilities, and anti-vehicle bomb protection. As a location endures, this may be augmented by more specialist facilities such as CCTV, anti-intruder fencing and security lighting.

Insight 3-4: Threat levels can go up and down repeatedly. They change far more rapidly than infrastructure can be adapted. Therefore physical protection, and its upgrades, must be planned for at the outset.

332. **Endorsement of use and inspection.** Risks are never taken blindly; therefore the UK Armed Forces must be sure of the level of protection afforded by its protective structures. Trials are often open to interpretation. The Competent Army Authority and Inspectorate (CAA&I) for all protective works is HQ EinC(A); its endorsement of new designs should be sought.

Section 5 – Tactical bases

333. **Operational effect.** Static, tactical bases are used to support a protracted presence of military capability at a particular location. They are the hubs around which forward operations are conducted on an enduring operation. While some bases are established to provide indirect support to operations, such as communications nodes or to control border-crossing points, others are required as a local base of operations for combat troops. On stabilisation operations in particular, tactical bases are used to achieve the following operational effects:

- a. Secure the population.
- b. Establish a stabilising presence.
- c. Create local influence.¹⁷

334. **Types of tactical base.** The terms Forward Operating Base (FOB), Patrol Base (PB), Checkpoint (CP) are descriptions based on the operational role of the base. Annex 3H defines each of these terms. Nevertheless, they are all tactical bases and, as such, share a number of common characteristics that influence their design and function.

335. **Challenges of a tactical base.** The planning for a tactical base must overcome a number of challenges:

- a. **Limited/no routine access by contractors.** This means that the construction and maintenance of tactical bases must be by military personnel. Those personnel must be trained on the equipment that is used in the base. Military personnel are only trained on the items listed in JTTP 4.05-1 *Compendium of Equipment Infrastructure*.
- b. **Remote/difficult access.** Tactical bases are hard to get to for geographic or operational reasons. This limits the opportunity to make adjustments to their infrastructure. It is important to be clear what is needed from the start in order to avoid constantly revisiting the sites.

¹⁷ AFM Vol 1, Part 10 *Counter Insurgency Operations*, January 2010.

c. **Urgent need and short tenure.** The need for a tactical base at a particular location may not be easily foreseen, allowing little time for preparation. Furthermore many bases have only a short anticipated tenure. Therefore the window of opportunity for planning may be very short indeed.

336. **Operational requirement.** Successful planning starts with a clear and specific operational requirement. This requirement is likely to include the base's function, its capability and capacity (see Annex 3I), and will be influenced by the local threat levels.

337. **Siting.** Bases are sited by the operational/Task Force headquarters, albeit with specialist advice. Although the desired operational effect takes primacy, there are other factors that should be considered when siting tactical bases:

a. **Risk to the population.** Tactical bases are likely to attract attacks and as such their presence may put the local populace and infrastructure at risk. Whether the damage is caused by the enemy or our response, it must be recognised that parties may try to exploit such events in attempt to turn the local population against us.

b. **Force protection.** Force protection will be paramount when considering the development of a tactical base. Both natural and man-made features that overlook the tactical base present the enemy with the opportunity to both conduct surveillance and mount attacks without being identified. The provision of multiple Entry Control Points (ECPs) to the larger bases will contribute the base's protection. Tactical bases must have a secure, defensible perimeter. Having the ability to vary entry and exit routes will make it more difficult for the enemy to target both the base and patrols, and increase the likelihood of forces being able to deploy in reaction to incidents. Entry control points do, however, make the base's perimeter more vulnerable to penetration. This risk can be reduced by ensuring the approach routes are observed, thereby allowing its occupants to respond to developing threats. Similarly, entry and exit must not improve the enemy's target array through people and vehicles having to loiter. If there is a requirement for searching, infrastructure should be put in

place to protect both individuals and vehicles from fire and observation without compromising the protection of the tactical base. The risk of environmental hazards impacting on the fighting capability of the tactical base must be acknowledged. These could range from local natural hazards (for example, malaria or cholera) to industrial hazards (such as toxic fumes).

c. **Force posture.** The posture will be dependent on the threat, the role of the base (it may house a number of different organisations), and the desire to interact with the local population. It will often have to be balanced against the UK Armed Forces protection requirements. To the local populace, a tactical base in their midst is a tangible demonstration of improved security. Its prompt and timely removal is evidence of a return to normality.

d. **Sustainability.** If sustainability is not adequately planned for, tactical bases cease to be enablers and become themselves the focus of operational activity. An assessment of the four Ds (Distance, Duration, Demand, Destination) when considering the full extent of the support required will highlight how to balance the need for regular re-supply against storage within the tactical base. One key area, particularly for operations in Africa/Asia, is the provision of water. Tactical bases, whether austere or developed, will have maintenance requirements. For the smaller locations, these may be limited to supporting the troops and their equipment, whilst for the larger sites it is likely to also include aspects of the base's infrastructure. Tactical bases are playing an increasingly significant role in the medical evacuation of injured personnel. When operating in complex terrain where the threat from Improvised Explosive Devices (IEDs) or indirect fire is prevalent, it may often be prudent to evacuate via the secure tactical base rather than attempting to establish an emergency Helicopter Landing Site (HLS).

e. **Expansion.** Tactical bases need to be sited such that there is capacity for expansion should the tactical situation change. As a planning guideline, there should be scope for bases being used by sub-units and below to be able to expand to accommodate the next level of command. Another area to consider is the partnering

continuum. Although force elements may initially be independently based, as the campaign develops there will be a requirement to collocate with elements of the host nation security forces.

Insight 3-5: A lack of provision of adequate expansion room can often compromise physical protection.

338. **Partnered bases.** Cultural understanding and national caveats will influence how combined forces operate and live alongside each other. Domestic facilities must take into account each party's military ethos, religious beliefs, and domestic habits. The theatre policy on integration will provide a guide.

339. **Tactical base as a system-of-systems.** A tactical base must be planned as a system-of-systems. Infrastructure provides the framework around which other systems are established. However, infrastructure is only one of eight systems that comprise the base. All systems must integrate together if the base is to operate efficiently. This is shown in Table 3.2 and Figure 3.4.

Ser	System	Addresses	In-theatre lead
(a)	(b)	(c)	(d)
1	Engineering/infrastructure	Structures, utilities	JFEngr
2	Command and battlespace management	Ops Rooms, comms	DComd JFCIS
3	Situational awareness	ISTAR	SO1 J3 Cap
4	Protection/integrated survivability	Weapon systems, alarms, physical protection, fire safety	User unit and Th Fire Offr
5	Logistics	Sustainability, food, ammo, ES	SO1 J4

Ser	System	Addresses	In-theatre lead
(a)	(b)	(c)	(d)
6	Medical	Trauma and Primary Health Care	SO2 Med and GM Med Sqn
7	Air/aviation	HLS, dust suppression	DCOS JHF
8	Domestic/welfare	Dining room, gym, welfare phones	SO1 J1

Table 3.2 – Systems comprising a tactical base

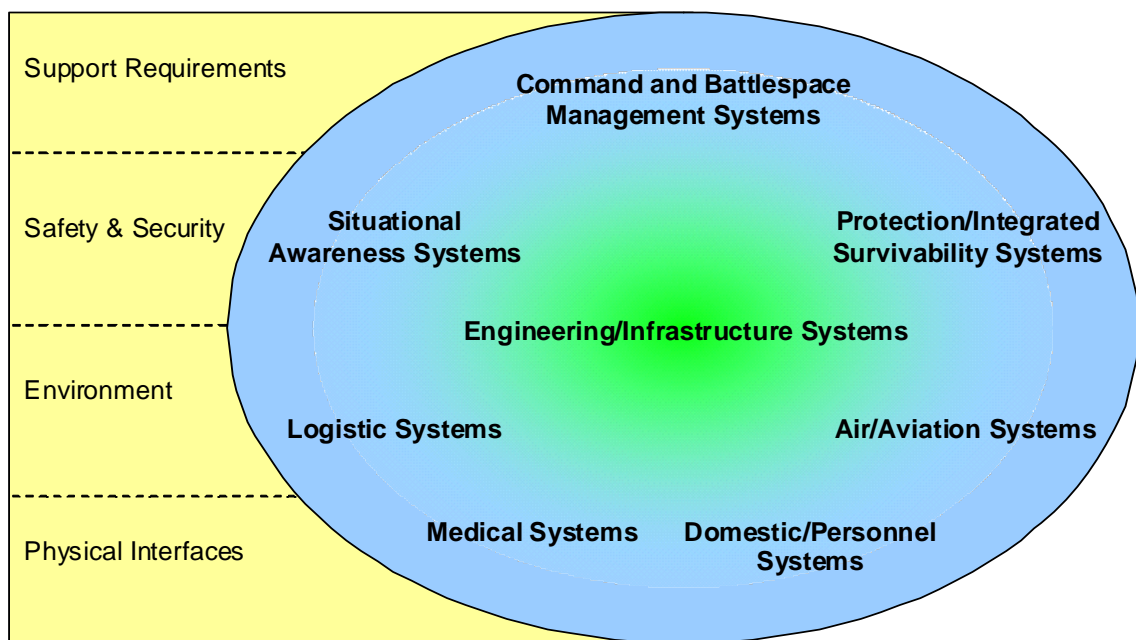


Figure 3.4 – Tactical base as a system-of-systems

340. **Generic base architecture.** It is important that all items of equipment (infrastructure or otherwise), which must operate from a tactical base, are able to integrate together. The MOD uses Def Stan 20-13 *Generic Base Architecture* to make sure that equipment is developed in an integrated manner. This document contains the Tactical Base Design Rules. These are a basic set of criteria upon which integration is based. They include basic

specifications and standard layouts. See Figure 3.5. It should be noted that many 'legacy' equipments exist that may not fully comply with these rules.

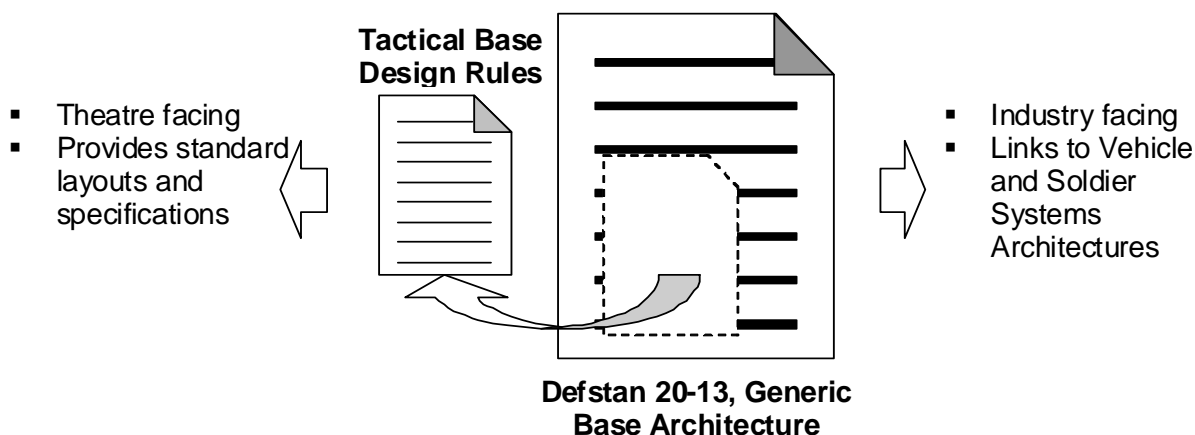


Figure 3.5 – Generic base architecture and Tactical Base Design Rules

341. **Capability integration.** The integration of the component systems of a tactical base must be planned early on. A base only exists in theatre and each base must take account of local threat, environmental conditions and the military capabilities that will be located there. The NSE should therefore plan the integration of all systems at the base. Table 3.2 gives an example of who, in theatre, may be responsible for the development of each base system. Each of the lead planners should be sufficiently familiar with their area of expertise and have access to details of any equipment that is needed and the integration issues associated with it. The Engineering/Infrastructure lead uses the Tactical Base Design Rules and JTTP 4-05.1 *Compendium of Equipment Infrastructure*.

342. **Establishing a base development plan.** The output of the planning meeting is a base development plan. This in turn guides the infrastructure development plan for the tactical base. An example is given at Annex 3J. Development for its own sake is needless and reduces the UK Armed Force's agility. A useful metric is to develop:

- a. Platoon bases to Level 0 or 1.
- b. Sub-unit bases to Level 2.
- c. Unit bases to Level 2 or 3.

Annex 3A – Items of infrastructure

3A1. This is a non-exhaustive list of the items of infrastructure required by a deployed force.

Entry points and lines-of-communication

- a. Border crossing points.
- b. Main supply routes.
- c. Bridges and trackway.
- d. Air ports of disembarkation (APOD) (and Deployed operating base (DOBs)), including air operating surfaces (runway, taxiway) and freight/passenger handling.
- e. Air traffic control, fire station and meteorological office.
- f. Sea port of disembarkation (SPOD), including freight transfer facilities and support to ships alongside.
- g. All-weather helicopter landing site (and possibly refuelling facility).

Facilities

- a. Formation HQ (offices, VTC suites, secure compartments, TEMPEST proofing).
- b. Domestic Accommodation (for example, ITC, TDA and hired camps), comprising:
 - (1) Sleeping (including VIP and transit).
 - (2) Laundry.
 - (3) Ablutions.

Components of the operational estate

- (4) Gym and fitness facilities.
 - (5) Kitchens and dining rooms.
 - (6) Unit offices and stores.
 - (7) Separate domestic facilities for other nations' forces.
- c. Utilities to support above.
 - d. Incinerators and waste disposal systems.
 - e. Camp internal roads, fences and drainage.
 - f. Camp HQ/admin centre.
 - g. Medical facilities (primary health care and trauma, medical evacuation, Field Hospital, field surgical facility).
 - h. Medical supply facilities (drug storage).
 - i. Equipment Support (ES) facilities, for example, a hardstanding and covered area in which to repair vehicles and their airside equivalent for fixed wing and rotary assets.
 - j. Log Supply Regt Store (TRV – land and air).
 - k. Ammunition and explosive stores (including process buildings and environmental control).
 - l. Engr Park (stores area, facilities for reconfiguration and practise assembly).
 - m. Communications infrastructure (server rooms, pits, ducts, masts, radome).
 - n. Convoy marshalling area.

- o. A- and B-vehicle parking and vehicle wash-down.
- p. Training facilities (ranges, search, convoy drills, RSOI classes).
- q. Education centre.
- r. Central laundry.
- s. Welfare (EFI and concessions).
- t. Internet and telephone facilities.
- u. POW or internment facility.
- v. HUMINT, including a walk-in facility for local population.
- w. Dog kennels and exercise areas.
- x. RMP offices and police post.
- y. FM facilities.

Utilities

- a. Power generation and distribution network (including backup).
- b. Water abstraction facility, such as a borehole.
- c. Water treatment, storage and distribution system (including water testing laboratory).
- d. Water bottling plant.
- e. Waste water disposal.
- f. Waste disposal facility (rubbish, water/sewage).
- g. Fuel BFI and MTFI and airside pan-refuelling.

Security and Operations

- a. Secure perimeter (examples of which are a ditch, fence, wall, lighting, or intruder detection) with both a main and alternative Entry Control Point.
- b. Pass offices (incorporating biometric systems and scanners).
- c. Public address and/or alarm system.
- d. Observation and fighting positions for both personnel (sangars) and vehicle-based weapon systems.
- e. Indirect fire positions (gun and mortar pits).
- f. Ops Room and guardroom.
- g. Shelters for personnel and critical facilities and stores (including separate stores for ammunition and weapons).
- h. Cover from view, cover from fire.
- i. Temporary detainee facilities (awaiting transit).
- j. Unloading bay, weapon zeroing range.
- k. UXO collection pit.
- j. ISTAR facilities (masts and designated areas in which to service equipment, for example, to wind down an observation balloon without snagging on parked vehicles).

Annex 3B – Marine and maritime facilities

3B1. **Maritime operations.** The maritime role in a Joint Operation could be wide ranging including, but not limited to: Naval gunfire support, anti-piracy, embargo enforcement, air defence, air combat, anti submarine, mine clearance, seabed surveying, Commando raids, and support to Special Forces. The infrastructure required to support this range of activity depends on the type of maritime facility and its operational role.

- a. **Sea Port of Disembarkation .** A Sea Port of Disembarkation (SPOD) is principally a location to offload personnel, stores, vehicles and other equipment from Strategic Ro-Ro and commercial shipping. RN/RFA use of the SPOD would be determined by Maritime tasking, the extent of the joint operations area and amount of shipping competing for berths at the SPOD.

- b. **Forward Logistics Site.** A Forward Logistics Site (FLS) provides a dedicated Maritime Intra Theatre Lift (MITL) node for RN/RFA shipping.

- c. **Forward Mounting Base.** In the context of maritime operations, a Forward Mounting Base (FMB) is a location, possibly sited within the joint operations area, remote from the combat area, which has the facilities to enable the Response Force Task Group (RFTG) to undertake:
 - (1) Tactical re-stow of munitions, vehicles and equipment within the attributed shipping.
 - (2) Weapon and equipment upgrades to ships (usually by contractor).
 - (3) Crew rotation on submarines and RFA.
 - (4) Recuperation combined with deep maintenance.
 - (5) Battle damage assessment, repair or recovery.

(6) Other logistic activities that cannot be easily undertaken in a busy SPOD.

d. **Combat Service Support Area.** Initial marine landing operations are supported through a temporary Beach Support Area (BSA). This may quickly evolve into a Combat Service Support Area (CSSA). A CSSA provides a much more substantial degree of support than a beach support area. It enables the Embarked Military Force (EMF) to replenish and acclimatise prior to further operational tasking.

Infrastructure must provide for the storage for 2nd line stocks and other logistic functions that may be required.

e. **Forward Support Unit.** A Forward Support Unit (FSU) provides 1st/2nd line engineering support for vessels. In addition to holding spares an Forward Support Unit may also provide environmentally controlled storage for munitions. It may operate from an forward mounting base.

3B2. **Infrastructure required.** Any of the following infrastructure may be needed.

a. Berthing facilities for RN, RFA and Chartered Commercial Shipping (with appropriate licensing and Host Nation Support).

b. Helicopter operating areas.

c. Ramp to accept Strategic Ro-Ro vessels.

d. Container crane and other handling equipment required to unload materiel.

e. Personnel, mail and cargo handling facilities.

f. Secure storage for all classes of supply (including munitions).

g. Temperature controlled storage for medical supplies, such as blood products.

- h. Water and fuel supply facilities.
- i. Appropriate hardstanding.
- j. Force protection and life support facilities.
- k. Integration with line-of-communications transportation (such as main supply route).
- l. Secure communications.
- m. Assured access to logistics Information Systems.
- n. Headquarters and technical accommodation.
- o. Offices for port agency representatives.

Annex 3C – Availability of critical facilities at an airbase

Ser	Facility	Well found	Austere	Bare	Remarks
(a)	(b)	(c)	(d)	(e)	(f)
1	Aircraft Operating Surfaces (AOS)	95%+	75%	50%	Any surface required to traffic aircraft and often includes aircraft sunshades and shelters.
2	Bulk fuel facilities	75%	50%	25%	Bunded fuel storage and distribution systems.
3	Explosive storage areas	75%	<25%	Nil	A minimum requirement of level, bunded storage and weapons preparation areas, covered and open with associated access tracks and lightning protection systems.
4	Force protection	90%	<25%	Nil	The shelters, elevated sangars, perimeter security and entry control points required to protect the airbase.
5	Operational technical facilities	90%	<25%	Nil	Structures required to house technical facilities such as workshops and operations rooms.
6	Domestic accommodation	90%	<25%	Nil	Accommodation from tents to hard-walled structures including associated services.

Table 3C.1 – Availability of critical facilities at an airbase

Notes:

1. Percentage figures are largely subjective estimates of how much the existing facilities can meet an operational need.
2. Even though a base may initially have enough infrastructure to be classed as well-found, the host nation or coalition partners may increase their uptake of that existing infrastructure leaving little for UK use. This may make the base in effect, bare.

Annex 3D – Infrastructure facility tiers

3D1. **Tier 1.** Follow-on, road, sea or rail deployable and re-deployable, robust, and easily erected facilities. They are required to sustain personnel in a wide range of climatic conditions. The facilities can be expected to endure without *refresh* for up to eight months and without *regeneration* for 24 months.¹ Although normally deployed by sea, individual elements must be air-transportable. In order to make sure that we capitalise on the speed with which they can be set up and that they can be used in less permissive environments, military personnel must be trained to assemble and maintain Tier 1 facilities.

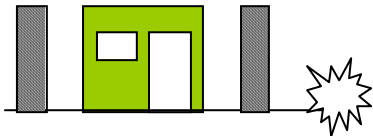
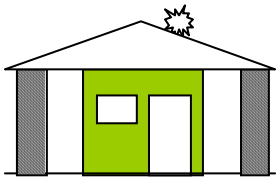
3D2. **Tier 2.** Tier 2 facilities provide an improved standard of accommodation and utility services to that of Tier 1. They should be operational within six months of the decision to proceed. Tier 2 facilities will normally be constructed, operated and maintained by a contractor, with an expected life of up to five years² without major refurbishment. Camps can comprise structures and equipment transported into theatre and/or sourced locally, or constructed from local materials. They are not normally expected to be re-deployable without substantial refurbishment.

3D3. **Tier 3.** Tier 3 structures are those built in-situ from traditional building materials such as concrete, steel and masonry to site-specific designs, taking the availability of materials and construction skills into account. They provide cost-effective facilities when considered over longer operating periods. They may incorporate a higher standard of comfort more appropriate for an enduring operation and/or a higher level of inherent protection commensurate with the longer exposure to risks that such an operation may bring.

¹ 'Refresh' is a largely cosmetic refurbishment in-situ (Level 3 maintenance). 'Regeneration' is a major overhaul that cannot be undertaken whilst the camp is occupied (Level 4 maintenance). Levels of maintenance are explained in Chapter 8.

² Timings are indicative of the normal maximum length of use. Tier 2 facilities may be required for longer if the situation demands; where this is the case extra maintenance and repair/replacement will be required.

Annex 3E – IDF protection levels for infrastructure facilities

Level	Form	Remarks
(a)	(b)	(c)
1	<p>Compartmentalisation</p> 	<p>Aim: This is only a mitigation measure to limit the overall number of casualties from a single event.</p> <p>Form: Compartmentalisation using anti-fragmentation walls.</p> <p>Protection: Protects personnel from fragments from weapon landing outside compartment. Mitigates number of casualties from a direct hit on a facility. Personnel vulnerable to fragments falling over the wall.</p> <p>Construction: Can be retrofitted only if enough space is allocated from outset and reserved for this use.</p>
2	<p>Limited overhead protection</p> 	<p>Aim: Protect against point-detonating battlefield weapons.</p> <p>Form: Level 1 plus limited overhead protection.</p> <p>Protection: Limited protection from small, impact-fused IDF rounds landing on roof. Degree of protection depends on actual measures used. There is a wide range of protection within this basic form.</p> <p>Construction: Time and cost vary depending on the solution and whether retrofit or new-build.</p>

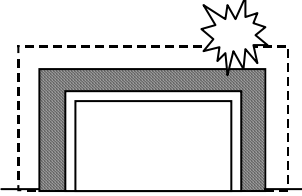
<p>3</p>	<p>Comprehensive IDF protection</p>  <p>The diagram illustrates a three-layered defense system. It consists of an innermost rectangular structure, a middle thick wall, and an outermost rectangular stand-off screen. A starburst symbol representing an explosion is shown outside the stand-off screen, indicating that the protection is designed to withstand such an event.</p>	<p>Aim: Protection regardless of fuse function.</p> <p>Form: Tripartite protection from stand-off screen, thick concrete/steel wall and internal stand-off.</p> <p>Protection: High degree of assured protection from wide range of dud, delay and impact-fused IDF weapons.</p> <p>Construction: May be expensive and very time-consuming to build.</p>
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Table 3E.1 – IDF protection levels for infrastructure facilities

Annex 3F – Medical facilities

3F1. **Types of medical treatment facilities.** Deployed Medical Treatment Facilities (MTF) are often amongst the most complex and challenging to develop on an operation. They are categorised by the level of support they provide:

- a. **Role 1.** Medical support integral or allocated to a small unit providing first aid, immediate life saving measures, and triage. Additionally, it contributes to the health and well-being of the unit through the provision of guidance in the prevention of disease, non-battle injuries and operational stress.
- b. **Role 2.** Medical support prepared to provide evacuation from Role 1 facilities, triage, resuscitation and treatment. It may, in certain circumstances, provide stabilising surgery (known as ‘Role 2 Enhanced’). In addition, patients may be held at this facility until they can be returned to duty or evacuated. Emergency dental treatment may also be given.
- c. **Role 3.** This includes additional capabilities such as specialist diagnostic resources, specialist surgical and medical capabilities, preventative medicine, food inspection, dentistry and operational stress management teams – when not provided at level 2. The size of a level 3 facility will be sufficient to allow diagnosis, treatment, and holding capacity of those patients who can receive total treatment and be returned to duty within the evacuation policy laid down by the UK Armed Force’s Surgeon for the theatre. A Field Hospital typically provides this level of support.

3F2. **Developing the requirement.** Capturing and developing the requirement is often particularly difficult. This Annex describes a number of requirement criteria that should be addressed. 170 Engr Gp maintains an STRE¹ that specialises in the design of hospitals, their input must be maintained throughout the project, from inception to handover. Both the Medical and Infrastructure Branches at PJHQ must agree to the requirement of a new hospital and any major alterations to the requirement must be

¹ Specialist Team Royal Engineers.

cleared through them beforehand. A medical project liaison officer should be appointed from the outset to provide 'client' continuity.

3F3. Minimum military requirement and medical opinion. The operational infrastructure paradigm is to provision to the minimum military requirement (see Chapter 2). This is difficult to balance with the demands of NHS policy, Health Technical Memoranda (HTM) and Health Building Notes (HBN). A medical subject matter expert must make an interpretation of what is acceptable on operations. This, however, is a subjective assessment made by an individual. It is unlikely that that individual will stay with a project throughout. The pressure therefore to change the requirement is always great. Therefore it is strongly advised that UK-based medical subject matter experts are selected by PJHQ Medical Branch to be empowered to act as the user in determining the requirement and 'signing-off' on each element of the project. A single medical point of contact will be established as soon as possible to provide continuity and bring coherence.

3F4. Design issues. The design issues to consider are:

- a. **Areas and uses.** The provisions of JSP 315, Scale 5, *Training Camps and Transit Accommodation* are sometimes inadequately detailed. Further 'base line' standards are needed from the medical community. Until resolved, this will be a potential source of problems.
- b. **Infection control.** The facility must be designed throughout to allow for waste management and infection control; this includes using the correct quality of materials through to layout and patient flow.
- c. **Overall layout.** Although there is usually general agreement on hospital layout, local constraints may require a reassessment. The location of the Hospital Management Cell is often debated. Changes to department location have a significant impact on the layout of services.
- d. **Structural impact on layout.** The position of columns or cabin walling will have a significant impact on the internal layout and hence on the functional operation.

- e. **Office requirements.** Office requirements are often overlooked.
- f. **Wash-hand basins.** These are often a surprisingly contentious issue. A tented hospital operates with very few wash-hand basins. Guidance on their provision in a Tier 2/3 hospital will be needed.
- g. **Toilets.** Almost every department will often ask for a male, female, assisted, and infectious patient toilet. This leads to excessive provision.
- h. **Isolation ward.** The provision of several en-suite single rooms may lead to waste.
- i. **Morgue and body handling facility.** These facilities are often overlooked.

3F5. **Maintenance.** The hospital will require facilities management support. Areas that cause particular difficulty are the CT scanner (and its datalink to the UK) and the operating theatre with its sterile, balanced air flow system.

Annex 3G – Infrastructure support to the NAAFI

3G1. NAAFI's Status. The Navy, Army and Air Force Institutes (NAAFI) is a not-for-profit organisation that provides Catering, Retail, Leisure, (CRL) support. Within NAAFI, the Expeditionary Forces Institute (EFI) is tasked to provide CRL support to those personnel deployed on operations overseas. NAAFI facilities are paid for from the MOD budget and are maintained at public expense.

3G2. Expeditionary Forces Institute infrastructure. At the outset of an operation EFI may well choose to operate from its vehicles along with the other force elements. Depending on the pace and progress of the operation, service personnel may move into some form of infrastructure. EFI is treated in exactly the same way as any other element of the UK Armed Forces. Its requirement for infrastructure is captured in the same way as others and an appropriate solution delivered and maintained by the UK Armed Forces.

3G3. Requirement through to maintenance. In theatre, the EFI submits a Statement of Requirement (SOR) to the infrastructure desk of the National Support Element (NSE). However, a copy should be sent to PJHQ for approval. This statement of requirement is highly likely to need a proposed layout. EFI may wish to put forward a nominated sub-contractor and indeed a pre-fabricated solution that meets the requirement. However, it is for the NSE to determine how best to deliver a solution; in doing so it will seek engineer advice on both construction and maintenance. Given the most likely location of any EFI, maintenance will probably be through the Infrastructure Support Provider (ISP) contractor.

3G4. Maintaining non-infrastructure items. The nature of the EFI's white goods (for example, cappuccino machine and milkshake maker) make it impractical for in-theatre assets to look after them, therefore all EFI's non-infrastructure 'fittings' are maintained by another contractor (which may be CONLOG). It is EFI's responsibility to make suitable arrangements, agreeing proposals with the NSE. In-theatre FM is restricted to the fabric of the building and its fixtures only.

3G5. Emergency repairs. Emergency repairs are conducted with the same prioritisation applied to other elements of the operational estate. When

an ISP contract is in place, their help desk should be used. The EFI manager is responsible for lodging requests for assistance with the help desk.

3G6. Facility development. The EFI facilities may be developed or enhanced at anytime. EFI should produce a statement of requirement. Again, a copy must be sent to PJHQ for approval. The NSE will cost the solution and confirm the proposals with PJHQ.

3G7. Concessionaires. EFI may wish to use concessionaires in its facilities. However, before they do so, the nature of support given to the concessionaires must be agreed with PJHQ. The MOD will seek to avoid taking vicarious responsibility for concessionaires. Advice should also be sought from the Defence Lands Agent before any agreement is concluded.

3G8. Capturing costs. It is important to make sure that the cost of EFI support is adequately captured. This will require careful coordination as the system described above will be funded through a variety of routes. PJHQ J8 is responsible for collating periodic summaries of expenditure on NAAFI facilities:

- a. **New builds and improvements.** As explained above, the statement of requirement and estimated cost of any new build or improvement is to be pre-approved by PJHQ. The actual cost can only be determined post-construction. Theatre must therefore annotate any invoice accordingly and make sure it is sent to PJHQ J8. This applies to all work, whether funded through in-theatre delegation or by specific financial approval from PJHQ.
- b. **Routine and pre-planned maintenance.** If the ISP is used to provide maintenance, it may be provisioned under a separate Works Area Package. Whether or not it is, the cost of support to the EFI must be readily distinguished from other maintenance on the operational estate.
- c. **Emergency repair.** It is not necessary to record emergency repairs undertaken through the ISP contract. These costs are not expected to be significant.

d. **Maintenance on non-infrastructure items.** These costs should also be collated with PJHQ J8.

3G9. **Non-NAAFI vendors.** The MOD will not assume responsibility for any non-NAAFI vendors.

Annex 3H – Types of tactical base¹

General tactical bases

3H1. **Forward Operating Base.** A Forward Operating Base (FOB) is a base used to plan, prepare, control, and coordinate, resource, conduct and recover from tactical operations. It may also be the location from which indirect fire weapons are used, or from which helicopter operations are also supported. The scale and range of military capabilities at a FOB usually result in it being of unit to sub-unit in size.

3H2. **Patrol Base.** A Patrol Base (PB) is a location from which limited foot or vehicle-based patrols are launched. It is typically *below* sub-unit in size. Therefore the military capabilities at a PB are generally less comprehensive than those in a FOB. Its anticipated tenure is also likely to be shorter than that of a FOB.

3H3. **Checkpoint.** Checkpoints (CP) control the flow of personnel and materiel along a route in order to thwart an adversary's operations. They are also used to dominate an area, create a sense of authority and security, and to re-establish the Rule of Law. This, and their generally exposed position, places them at high risk of attack. The old term Permanent Vehicle Checkpoint (PVCP) has been used in the past, however, it should be recognised that checkpoints control the flow of personnel and materiel, not just vehicles. A checkpoint should not be confused with an Entry Control Point (ECP) which is used at the entrance to a base.²

Special purpose tactical bases

3H4. **Border Crossing Point.** Border Crossing Points (BXP) are a special form of checkpoint used to control access to a country. It is likely to be collocated with host nation customs personnel or other security forces. It is also likely to have large convoy handling facilities.

3H5. **Fire Base.** A Fire Base (FB) is a tactical base whose sole purpose is to provide a secure location from which to use indirect fire weapons.

¹ Extracted from AFM 10, *Stabilisation Operations*

² JDP 3-64.1 *Force Protection Engineering*

3H6. **Forward Arming and Refuelling Point.** A Forward Arming and Refuelling Point (FARP) is a location whose sole purpose is the support of helicopter operations away from a main base.

3H7. **Observation Post.** An Observation Post (OP) is a location whose sole purpose is observation of an area of operational interest. They are sited primarily to make sure the optimum function of its constituent ISTAR assets.

3H8. **Communications Site.** A Communication Site (CS) is a location whose sole purpose is to support communications across the joint operations area. They are sited primarily to make sure the optimum function of its constituent communications assets, such as rebroadcast.

3H9. **Embedded Camp.** An Embedded Camp (EC) is a location inside another Force's base. In addition to domestic facilities, it might need UK-constructed and maintained training, or other specialist facilities, depending on the function of the embedded organisation. It is likely to have some form of perimeter separating it from the host facility. Embedded Camps have been used to support a Military Training Team (MiTT), Operational Manoeuvre Liaison Team (OMLT) and Embedded Partnering and Mentoring Team (EbP&M Team). The central feature is that the base supports a 'team' living out of a *camp* inside someone else's *base*.

3H10. **Logistic Base.** A Logistic Base (LB) is a location whose main function is logistic support to operations. A LB may, for example, be established on a long Main Supply Route (MSR) where stores may need cross-loading and reconfiguring before delivery to forward units.

Annex 3I – Tactical base sizes and development levels

3I1. **Base size.** The planning sizes for tactical bases are shown in Table 3I.1. In each case, the capacity is *up to* the size shown. Bases may grow from one size to another. Equipment systems are optimised¹ to support bases of these sizes. Therefore planning based on these metrics of size are more likely to match available or developing equipment.

Ser	Size	Remarks
(a)	(b)	(c)
1	30 man	Platoon size
2	100 man	Subunit (-)
3	300 man	Typical size of a manoeuvre sub-unit with attachments

Table 3I.1 – Base size

3I2. **Development, austerity and comfort.** Bases will be subject to a development plan in which the deployed Force will specify a level of comfort/austerity commensurate with the appropriate balance of investment of resources and anticipated tenure. These development levels are shown in the tables below.

- a. Level 0, Field Conditions.
- b. Level 1, Austere Base.
- c. Level 2, Year-round Base.
- d. Level 3, Enduring Base.

¹ For example, capacity, usage, occupancy, and fuel efficiency.

Level 0: Field conditions
Capability: No improvements (beyond those carried out by occupying unit) to sustainment or local security. Limited operational capability. This accepts significant degradation over time, of personnel efficiency and/or combat effectiveness.
Almost exclusively unit-organic equipment. Units <i>camping-with-equipment</i> .

Table 3I.2 – Tactical base development Level 0

Level 1: Austere base	
<p>Capability: An austere base providing the minimum of life support to maintain basic health and tactical command and control. Force Protection to protect against overrun. Immediate, but limited support to achieve modest improvements to security and operational capability through improved living conditions, for example, limited winterisation. Personal and base administration burden detracts considerably from military effectiveness.</p>	
Engineering/ infrastructure	Limited weather resistance. Basic power supply.
Command and battlespace management	Battery charging facilities. Data and voice delivered on case-by-case basis with limited connectivity to the remainder of the network. Best effort to protect system from environmental conditions. Installation of services in line with Theatre minimum installation standards.
Situational awareness	Unit-organic capability enhanced with ability to detect suspicious activity within weapons range of the base. Systems are user operated and maintained, battery powered.
Protection/ integrated survivability	Protect against overrun, limited IDF and small arms protection provided through FPE. Dynamic Risk Assessment undertaken by base commander, written record required. Trained Fire NCO. Smoke detectors in accommodation if reasonably practicable. Fire Extinguishers to mitigate a small fire outbreak.
Logistic	Individual feeding using rations. Ability to ground-dump ammo and stores. Dedicated work area to allow user-level basic first line service and basic accounting.
Medical	Qualified person based at location. Covered medical care area with limited medical Primary Health Care and trauma equipment.
Air/aviation	Landing Zone for SH within secured perimeter to prevent repeated need for IED clearance. Dust management

	scheme. LZ approved by MAOT and entered into Theatre HLS Directory. FOD to be cleared but low-lying vegetation may be left.
Domestic/ welfare	No/minimal welfare facilities.

Table 3I.3 – Tactical base development Level 1

Level 2: Year-round base	
Capability: The minimum conditions required to enable the base to operate all year round. Winterisation complete. Planned development in line with Design, Resource, Construct and Maintain process. Force Protection gives domination of adjacent terrain. Base administration remains considerable and leads to a moderate loss of effectiveness.	
Engineering/ infrastructure	Weather-proof structures and some tracks/hardstanding. Safe drinking water, potable water for washing. Centralised utilities and ring mains. Improvised laundry.
Command and battlespace management	Quantity and resilience of facilities enhanced. Up to eight User Access Devices. Remote access applications enabled. Level 1 and 2 maintenance through FRT. Limited mission-support critical services. System protected from environment.
Situational awareness	Level 1 or 2 protection (depending on threat) and fixed surveillance suite linked back to Ops Room. Ability to detect suspicious activity within weapons range of the base.
Protection/ integrated survivability	Protect against over-run, limited IDF and small arms protection provided through FPE. Two vehicle-capable ECPs. Appointed responsible person to manage fire safety. Full scaling of fire-fighting equipment. Formal fire risk assessment by Fire Officer. Regular inspection.
Logistic	Group feeding. Hardstanding and cover for surged ES. Protected ammo storage. Storage allows for surge. Convoy holding area.
Medical	Covered medical care area with limited medical Primary Health Care and trauma equipment. Limited isolation facility. Cold storage. Heating/drying facilities. Clinical and refuse disposal arrangements.
Air/aviation	Landing Zone for SH within secured perimeter to prevent repeated needed for IED clearance. Dust management scheme. LZ approved by MAOT and entered into Theatre

	HLS Directory. FOD to be cleared but low-lying vegetation may be left. Limited light vehicle movement up to, and on, the HLS.
Domestic/ welfare	Entitled level of Deployed Welfare Package distributed by unit QM. Could include BGAN, Textlink, TV/DVD.

Table 3I.4 – Tactical base development Level 2

Level 3: Enduring base	
<p>Capability: A base developed to maximise military capability and effectiveness. Living conditions deemed to be developed and optimised for protracted occupation. Use of technology to enhance domination of the local area. Fixes the fewest military personnel to base support functions. Possibility of handover of maintenance to a contractor. (Note level 3 is typical of a Main Base.)</p>	
Engineering/ infrastructure	Efficient functioning of personnel and equipment maintained with minimum impact from adverse weather. Full range of utilities. Safe drinking water, potable water for washing.
Command and battlespace management	Tactical Network Gateway. Enhanced capability providing connectivity to wider coalition Force network. Up to 250 User Access Devices. All applications available locally or sufficient bandwidth for remote access. Full suite of mission critical or mission-support critical voice and data services. SATCOM. TEMPEST facilities.
Situational awareness	Level 1 or 2 protection (depending on threat) and enhanced surveillance suite linked back to Ops Room.
Protection/ integrated survivability	Layered protection. Two vehicle ECPs. Full scaling of fire fighting equipment. Emergency alarm and lighting. Formal fire risk assessment by Fire Officer. Regular inspection.
Logistic	Group feeding with dedicated catering personnel. Temperature controlled storage. Hard standing and securable, covered storage areas for materiel. Areas suitable for operation of MHE. Well-found 1 st line ES facilities. Laundry. Protected ammo storage for multiple natures. Convoy marshalling area.
Medical	Medical centre with treatment room. Temperature controlled storage. Isolation facility. Heating/drying facilities. Clinical and refuse disposal arrangements.

Components of the operational estate

Air/aviation	Prepared HLS surface free from dust and standing water. Approach markings. Crash management plan. Air-ground comms. Safety lighting for USL preparation. Access for ACHE to move to/from HLS and storage area. Possible FARP.
Domestic/welfare	Entitled level of Deployed Welfare Package. Additionally, may include gym, BFBS TV, e-bluey and EFI.

Table 3I.5 – Tactical base development Level 3

Annex 3J – Example tactical base Infrastructure Development Plan

Level 2, 100-man tactical base

Ser	System	Infrastructure requirement
(a)	(b)	(d)
1	Engineering/ infrastructure	Hardcore tracks/hardstanding. Generator farm and ring main. Borehole and pump, WPU and 50,000 l storage. Waste water treatment. One laundry tent plus heater.
2	Command and battlespace management	Two Ops Room HABs. Space for three masts.
3	Situational awareness	Space for three ISO containers.
4	Protection/ integrated survivability	Wire and <i>Hesco</i> perimeter with two vehicle ECPs. Protected shelters for accommodation and Ops Room. Protect against overrun (internal fighting positions), limited IDF and small arms protection provided through FPE. Perimeter vehicle weapons platforms. Battery operated smoke detectors fitted to all shelters.
5	Logistic	OFCS (three 40-man module) Double HAB for protected dining area. Two food storage ISOs one of which to be a <i>reefer</i> . Two RUASP. Three covered ES inspection bays (30 x 15 m hardstanding), lit and sockets for power tools. One ES ISO. 4 x 25,000 l fuel

Components of the operational estate

		tanks. Hardstanding at refuelling point. Convoy holding area (30 m x 70 m).
6	Medical	Medical HAB and one isolation tent. Cold storage. Two showers, BFHU and two ablution units. Two WAG-bag stalls. Additional WAG-bag stall for isolation, next to isolation tent. Four desert rose and soak-away. Incinerator (and back-up burn pit).
7	Air/aviation	Landing Zone for SH within secured perimeter. Dust management scheme. LZ approved by MAOT. FOD to be cleared but low-lying vegetation may be left. Quad-bike track up to and on the HLS.
8	Domestic/welfare	Protected tent for paradigm phones and Deployed Welfare Package. Separate gym tent for non-powered Operational Fitness Equipment.

Chapter 4 –Through life management

Section 1 – Procuring and managing the estate

401. **Through Life approach to acquisition.** The term ‘Through Life Management’ (TLM)¹ relates to the MOD’s acquisition lifecycle and is usually applied to the procurement of equipment, but it is also applicable to operational infrastructure. Although many of the terms used are different between equipment and construction procurement, the processes are essentially very similar. The Through Life Management approach has a number of easily identifiable characteristics that apply to programmes and projects:

- a. Whole life outlook.
- b. Whole life system outlook.
- c. Whole life costs.
- d. Involvement of Stakeholders.
- e. Through Life Management Plan.
- f. Better decision making.
- g. Delivery team and stakeholder processes.

402. **Problems applying Through Life Management.** When no longer needed, equipment infrastructure may be returned to storage ready for redeployment, other forms of infrastructure, however, may not. Furthermore, as explained in Chapter 2, uncertainty over the duration of a military operation creates an ‘operational fog’ which seriously limits any investment horizon.

¹ This is described in the Acquisition Operating Framework (AOF).

Insight 4-1: Care must be taken not to waste time developing overly complex Through Life Management plans, as the Whole Life Cost of infrastructure is impossible to predict with any reasonable fidelity until the duration of an operation is certain.

403. **Acquisition lifecycle.** The acquisition lifecycle is at the centre of TLM. There are two main variants of the lifecycle, both are known by the acronym formed by their constituent stages.

- a. **Concept, Assessment, Demonstration, Manufacture, In-Service, Disposal.** Concept, Assessment, Demonstration, Manufacture, In-Service, Disposal (CADMID) for the acquisition of tangible assets (for example, equipment).
- b. **Concept, Assessment, Demonstration, Migration, In-Service, Termination).** Concept, Assessment, Demonstration, Migration, In-Service, Termination (CADMIT) for the provision of services.

404. **Infrastructure support within Through Life Management.** Figure 4.1 shows how infrastructure support sits within Through Life Management. The stages of an infrastructure construction project map across well to those of a CADMID/T lifecycle. The project stages themselves are explained later in this Chapter. After construction, infrastructure is maintained in-service through Facilities Management (FM). Facilities management is explained in more detail in Part 2. Finally, infrastructure is disposed of, or services transferred/terminated.

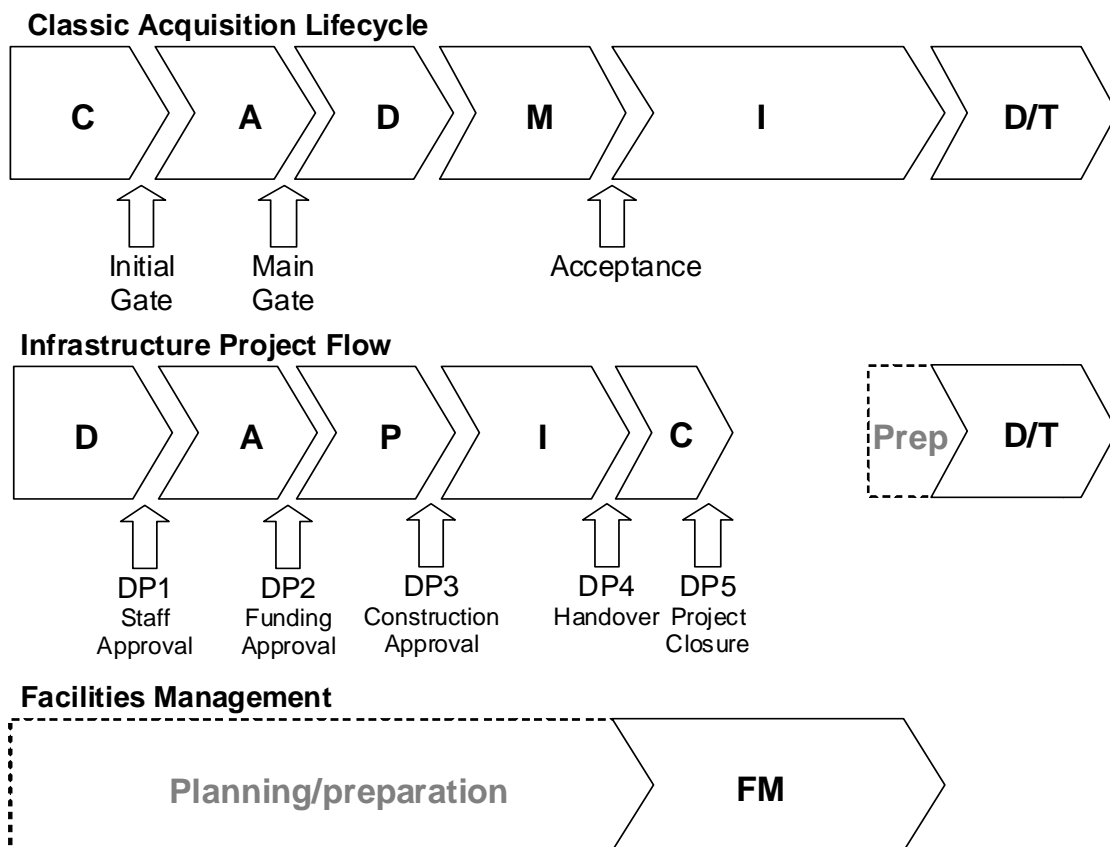


Figure 4.1 – Infrastructure support within Through Life Management

Section 2 – Programme management

405. **Programme management.** Programme management is the coordination, direction and oversight of the implementation of a set of related projects and activities in order to deliver *outcomes* and benefits related to an organisation's strategic objectives. In the context of the deployed Force it is therefore about ensuring that infrastructure *and other* projects and activities deliver the changes in military capability that are required within the overall operational strategy and plans. Programme management therefore aligns three critical elements:

- a. The operational strategy and plans.
- b. Delivery mechanisms for change.
- c. Normal, business-as-usual activities.

406. **Infrastructure is a line-of-development.** As explained at the start of Chapter 1, operational infrastructure is merely one of many lines-of-development. Programme management ensures that all other aspects are addressed in order to develop a coherent capability. For example, a new hospital facility is not just delivered by having a building; it also needs, amongst other things, trained personnel and equipment to be a functioning capability.

Insight 4-2: The non-infrastructure lines of development must be addressed in order to produce a functioning capability. The Infrastructure Staff by themselves cannot deliver them.

407. **Senior Responsible Owner.** The term Senior Responsible Owner (SRO) is applied to the person responsible for ensuring that the programme of change meets its objectives and delivers the projected benefits. Again, in the context of the deployed Force and the changes (or support) to military capability that such a programme delivers, the commander of the National Support Element (NSE) (or equivalent) is usually the SRO. However, this is determined by PJHQ.

408. **Stakeholders.** Stakeholders are people or organisations with an interest in the programme. They must be engaged and led through the programme management process. Stakeholders could be:

- a. Operational planners.
- b. Users.
- c. Subject Matter Experts (SMEs) (including 'authorities').
- d. Coalition partners or the host nation.

409. **Infrastructure Programme.** The development of the operational estate within a Joint Operations Area (JOA) is coordinated through an Infrastructure Programme (IP).

a. **The need for an Infrastructure Programme.** Although there are usually low levels of ambiguity about what the programme is to deliver, there is invariably a paucity of resources, considerable complexity and a high level of risk. The Infrastructure Programme makes sure that the requirement for resources is understood, that the interdependency of projects is identified and managed,² and that risk is made known.

b. **Authorship of the Infrastructure Programme.** It is for PJHQ to determine who prepares the Infrastructure Programme. It is usual for this to be assigned to the in-theatre Infrastructure Staff. However, it may be appropriate for PJHQ to retain this role or to assign it to someone else such as HQ AIR. This person is then the Infrastructure Programme Manager.

c. **Relationship with Theatre Infrastructure Development Directive and Infrastructure Development Plans.** The Infrastructure Programme shows how projects across a joint operations area are scheduled to deliver the work needed in the site-specific Infrastructure Development Plans (IDPs). The Infrastructure Programme therefore shows how the operational estate will develop in accordance with the Theatre Infrastructure Development Directive (TIDD). It also feeds back future resource requirements to PJHQ for the next iteration of the TIDD.

d. **Other lines-of-development.** The Infrastructure Programme provides a key input to the schedule for the completion of the other lines-of-development.

410. **Programme risk.** Using the Infrastructure Programme, or otherwise, the Infrastructure Staff should identify and report on programme risks. These relate to the likelihood of adverse effects impacting on the military operation. Therefore when articulating a risk, its operational context must be made clear, for example, 'late delivery of airside facilities will delay the deployment of a new aircraft' or 'failure to agree on a transfer strategy will mean the loss of valuable equipment'.

² Including initiating, speeding-up, delaying or stopping projects.

Section 3 – Project management

411. **Project management.** Project management is the process of planning, organising, securing and managing resources to bring about the successful completion of specific project goals and objectives. A project is a unique, temporary endeavour, having a defined beginning and end. In the context of the operational estate it is therefore about delivering either a new item of infrastructure, or support for it. It is a complex process and is explained in detail in JTTP 4-05.3 *Infrastructure Project Management*. Infrastructure Staff must understand the process and their part in it.

412. **The need for a Project Manager.** Part 2 explains how infrastructure support is delivered on operations. There are many possible sources. The Infrastructure Staff must make sure that it is clear who the Project Manager is and what they are responsible for. Someone must be responsible for ensuring the project is ready to handover, on time and to the correct quality standard. In most cases it is expected that the Joint Force Engineer will arrange the appointment of the Project Manager.

Insight 4-3: Be clear who the Project Manager is and what they are responsible for. Someone must be responsible for ensuring that the project is ready to hand over.

413. **Stages of a project.** There are five stages to a project. Depending on the size and complexity of the work required, these may be simplified or broken down into more detail. As shown in Figure 4-1, each stage has a defined activity and terminates in a Decision Point (DP). They are explained in more detail in JTTP 4-05.3.

- a. **Definition and Decision Point 1, Initial Staff Approval.** During this stage, the requirement is identified and clarified *sufficiently* for the Infrastructure Staff to decide whether to proceed. If it is, Initial Staff Approval is given.
- b. **Assessment and Decision Point 2, Funding Approval.** During the Assessment stage the requirement is finalised as the design

concept is produced and developed. The Infrastructure Staff³ conduct a Siting Board, guidance for which is given in Annex 4A.⁴ The different delivery courses-of-action are examined by the Infrastructure Staff in an Investment Appraisal. These are then presented in a business case, which, if successful, culminates in Funding Approval.

c. Preparation and Decision Point 3, Construction Approval.

Preparation now incurs increasing expense within the project; long-lead materials are obtained and contracts are tendered. Contracts are awarded and Construction Approval given at the end of this stage.

d. Implementation and Decision Point 4, Handover Acceptance.

Construction work is undertaken during the Implementation stage. Costs and progress are monitored against the planned estimates. Throughout this stage preparation is made for formal handover. As sections of work near completion, a pre-handover Board should examine the work to make sure that any non-compliances or problems are identified early enough to be easily resolved. Finally, the transfer of responsibility is agreed at a Handover Board, guidance for which is given at Annex 4B. This is based on JSP 435 *Defence Estate Management*.

e. Closure and Decision Point 5, Project Closure. The Handover Board is likely to identify a number of defects and deficiencies (commonly known as 'snags'). An agreement must be reached on how to address them before the project may be allowed to close at DP5.

Section 4 – Disposal and termination

414. **Planning.** The decommissioning and disposal of infrastructure is a complex and lengthy process often taking many months, if not years, to resolve finally. If it is to be done in good order, with the minimum of waste, it should be planned from the outset of an operation. There are, however, a number of significant issues that make this particularly difficult:

³ This may be delegated to others if access is impractical.

⁴ Based on JSP 435 *Defence Estate Management*.

- a. **Operational fog.** Uncertainty over the path, progress and future course of an operation (the 'operational fog') rarely allows a long-term plan with sufficient detail to shape decisions.
- b. **The successor.** It is usually far from clear at the outset who will take over after the UK Armed Forces leave. It could be a coalition partner or the host nation. Alternatively, it may be a non-military body, such as a government ministry. Each has different needs and capabilities.
- c. **Successor's capability and plans.** Even if the successor is identified, it is unlikely that they will be able to confirm whether they will need or want our infrastructure, and whether they can maintain and operate it.
- d. **Funding.** If a project is not directly intended to support our Forces then sources of funds other than Net Additional Costs of Military Operations (NACMO) ought to be used. This significantly complicates and slows down procurement. It is often easier simply to assume that the infrastructure will only ever be for use by a UK Force.

415. **Ownership.** The first step is to establish ownership; often the provenance may be unclear. Advice and records from Defence Lands Agent are invaluable in determining land and indigenous infrastructure ownership. Ideally, theatre's IDPs and Asset Register should also provide a record. Details should be checked before disposal plans are confirmed. Determining ownership of equipment or constructed infrastructure can often be more complex. Particular areas of uncertainty are:

- a. **Items Inherited from coalition partners.** As they withdraw from an operation, coalition partners may transfer equipment or constructed infrastructure to the UK Force. The terms of that transfer must be confirmed. Are the items to be returned to the partner, or are we free to dispose of them as we wish?
- b. **Joint facilities.** Some facilities are jointly developed with and/or funded by a coalition partner. If the partner remains and wishes to continue to use the facility, how should the UK transfer its interests?

c. **Facilities embedded within a 3rd party's base.** If items of the operational estate are embedded inside a 3rd party's base, the UK may be limited in its options for disposal.

416. **Valuation.** Before disposal, either by gifting or sale, the value of the asset must be determined; usually this may only be done by the Defence Sales Agency. The Agency will usually seek to conduct a competitive tender, public auction, or use their network of marketing contractors. This may take some time to set up and prepare in an operational Theatre.

417. **Disposing of indigenous infrastructure.** Indigenous infrastructure is usually returned to its original owner. If, after investigation, ownership remains unclear or ambiguous, then the host nation's advice should be sought. Joint Tactics, Techniques and Procedures (JTTP) 4-05.2 *Lands and Environmental Procedures* gives details on the disposal of the sites themselves.

418. **Disposing of constructed infrastructure.** If constructed infrastructure is to be transferred successfully, the new prospective owner must be happy to take it over and be able to operate and maintain it. This can be a significant problem for utilities and complex facilities. Some structures may be clearly military in nature (for example, guard towers) or have operational sensitivity (such as, formation headquarters and detention facilities). If so, it may be more prudent to demolish them rather than risk any subsequent adverse presentational issues. PJHQ (rather than DIO) must also agree to forgo the receipts of sale for constructed infrastructure. Public funds should not be used for the construction, relocation and rededication of memorials.

419. **Disposing of equipment infrastructure.** To dispose of an item of equipment infrastructure, the agreement of the Equipment Manager must first be obtained. If it is to be gifted, the Equipment Manager must agree to forgo receipts from any sales. If items are simply to be returned to the UK for *regeneration* (see Annex 3D), the Equipment Manager should first assess whether this is worthwhile. It may be more cost effective for PJHQ to fund replacement back in the UK. The decision on the most appropriate route for disposal will be heavily influenced by the Value for Money (VfM) that each offers. Urgent Operating Requirement (UOR) equipment should not be

returned to the UK unless specific agreement is given by the Capability Sponsor to 'bring it into core'.

420. **Disposing of contracts.** Contracts will usually specify the notice that must be given to terminate them before their agreed date. Early termination is likely to incur a cost. Alternatively, a contract may be transferred to another party. This is known as 'novation'. Most large infrastructure contracts have clauses that stipulate how this may be undertaken.

421. **Handing over safety information.** Any information required for the safe management of a site should be handed over. This is explained in more detail in Chapter 10.

422. **Gifting.** The provisions of JSP 462 *Financial Management Policy Manual* strictly control gifting. It is primarily a financial issue and is therefore led by J8. The JSP states, '... gifting of non-warlike equipment may be undertaken where this offers a cost-effective alternative to local sale or return to the UK, or where such gifting is coherent with the aims of a particular operation.' Only non-warlike items may be gifted. It is open to interpretation as to whether barbed wire and sangars are items of *warlike equipment*. It should also be noted that some equipment might be subject to export licensing control. Gifts over £250,000 require Treasury and Parliamentary approval; this can take a considerable length of time. Novel and contentious issues should be cleared with the Treasury.

423. **Withdrawal and site disposal.** Detailed guidance on withdrawal and site disposal is given in JTTP 4-05.2 *Lands and Environmental Procedures*. Ideally, a Post-occupation Survey (POS) and a Land Quality Assessment (LQA) are conducted. These help preserve the reputation of the UK Armed Forces and limit our liability against claims for damages long after the end of the Operation.

424. **Remediation.** It is highly likely that some form of remediation will be required.

- a. **Demolition and tidy-up.** For the reasons explained above, and subject to the conditions of transfer to a subsequent owner, it may be necessary to demolish and tidy-up the site. This will probably follow a

final security and classified-material sweep. The acceptable 'end-state' must be clearly specified to those doing the work (for example, how 'demolished' should structures be and what should be done with foundations, rubble, and buried services).

b. **Environmental considerations.** Guidance on environmental procedures is given in more detail in Part 3 and JTTP 4-05.2. Early consideration of environmental considerations will reduce the potential for future liabilities.

Annex 4A – Siting Boards

4A1. **Purpose.** For all but the most straightforward of projects, the Infrastructure Staff should convene a formal Siting Board. The aims of the Board are to:

- a. Identify, without ambiguity, where exactly a particular item of infrastructure is required.
- b. Determine what authority/agreement is needed to allow it to be built there and any regulatory constraints.
- c. Identify any impacts on base operations during construction or post-construction.
- d. Identify any constraints on design or construction method.

4A2. **Attendance.** In addition to any stakeholder with a particular interest in the work, those attending *should* include representatives of:

- a. The body or organisation that controls Real Estate allocation; this can be complex on a multi-nation, coalition camp within a host nation facility.
- b. The organisation that will use the infrastructure and understands what activities may cause problems for those around it, for example, ammunition processing, detainee handling, and helicopter operations.
- c. The organisation that will construct it, so that the impact of construction work can be explained and the significance identified, for example, access for construction vehicles, cranes obstructing flight safety lanes, dust and noise next to the hospital, and extra space construction for access and stores.
- d. Any relevant Subject Matter Experts (SMEs), such as the Fire Officer or Air Traffic Control staff.

4A3. **Agenda.** Some of the main issues to clarify are therefore:

- a. Authority for land use.
- b. Location, footprint and orientation of the infrastructure.
- c. Operational, safety, environmental or other constraints.
- d. Impact the facility and its construction will have on other operations from the base.
- e. Regulatory, procedural or other compliances that must be sought.
- f. Impact on Force Protection.

4A4. **Record.** The results of the Board should be recorded and sent to all stakeholders. Any format may be used, however, the template at Annex 4C is a useful guide.

Annex 4B – Handover Boards

4B1. **Purpose.** The purpose of a Handover Board is to determine whether the construction of a new item of infrastructure is acceptable in order to allow the transfer of responsibility from the constructor to those who will maintain it. It therefore supports DP4. Even if the facility is built and then operated by the same contractor/ organisation, a Handover Board is still required to highlight any remaining issues, such as fitness for purpose and release of payment. Formal Handover Boards are convened and chaired by the Infrastructure Staff.

4B2. **Pre-handover Boards.** Well before the completion and formal handover of a facility, at least one on-site review should be conducted to discuss any outstanding issues that may preclude acceptance of the completed facility. This is the pre-handover equivalent to ‘snagging’ and is good practice. Depending on the complexity of the project, it should be done two to six weeks before formal handover and is arranged by the Project Manager.

4B3. **Beneficial occupancy.** Before a facility is completed, operational imperatives may lead to the user occupying some or all of the facility before formal handover. This is known as ‘beneficial occupancy’. Although it allows an early Initial Operating Capability (IOC) to be declared, it should be avoided whenever possible as it leads to complications over responsibilities for facilities management and makes it easier for a contractor to abrogate responsibility for any unresolved problems at handover. It therefore can lead to a delay in Full Operating Capability (FOC) and an increase in cost. In the worst case, it can also lead to the project *never* being completed.

4B4. **Attendance.** In addition to any stakeholder with a particular interest in the work, those attending the Handover Board *should* include representatives of:

- a. The Project Manager.
- b. The user.
- c. The construction organisation.

- d. The maintenance organisation.
- e. Health and safety organisations such as the Fire Officer and Environmental Health Team.

4B5. **Checking acceptability.** All key stakeholders should tour the site to make sure that the facility will be suitable for use and will be ready to transfer to those responsible for its maintenance. It is important to check what is being provided *against the originally agreed requirement and any subsequently authorised Variation Orders*. As explained in Chapter 4, the standard should be 'good enough'. This includes any information the construction organisation will pass to the maintainer.

4B6. **Certificate of Practical Completion.** If a warranty period has been agreed with a contractor, then a Certificate of Practical Completion is issued. This simply marks the end of construction not the end of the contract.

4B7. **Defects.** Usually there are some outstanding problems (construction or contractual defects) to be resolved; an agreement must be reached, and recorded, on what to do about them. Possible options include:

- a. Allowing the construction organisation to continue working. In the case of a contractor this may also mean withholding part-payment until the issues are resolved. This is often allowed for in a contract under a specific Defects Liability period.
- b. Arranging for the maintainer to fix the problems.
- c. Bringing in a third party to resolve the issues. This must be considered a last resort.

4B8. **Record of Decisions and Handover Certificate.** The results of the Board should be recorded and sent to all stakeholders. The record should list attendees and should state the decisions of the Board, particularly in regard to any outstanding defects. A formal **Handover Certificate must be issued**, noting any unresolved issues and confirmation that the maintaining organisation accepts responsibility from that point on. Any format may be used, however, the template at Annex 4C is a useful guide.

Insight 4B-1: Ensuring that a Handover Certificate is issued makes a clean break between constructor and maintainer. A written record of what was agreed is essential as the resolution of outstanding issues often takes a considerable time.

4B9. Health and Safety File and operation and maintenance information. On conclusion of the project, the construction organisation must pass a Health and Safety File to those responsible for its maintenance. This should include such things as electrical and fire safety certificates, mechanical commissioning certificates and OEM¹ instructions for the operation and maintenance of equipment.

4B10. Asset Register. Finally, the Infrastructure Staff must make sure that the item is entered on the Theatre Asset Register.

¹ An Original Equipment Manufacturer (OEM) is a third party company whose products are incorporated into the facility.

Through life management

Annex 4C – Proforma for Siting, Handover and Takeover Boards

Unit Ref:
Infra Task No:

Section 1: Details of the board (Note 2)	
Proceedings of a	
Convened at	
By order of	
For the purpose of	
President	
Members	
In Attendance	

Section 2: Findings of the board (Note 3)

Section 3: Recommendations of the board (Note 3)

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Signature of President:	Signature of Member:	Signature of Member:
Signature of Member:	Signature of Member:	Signature of Member:
Date:		

Section 4: Remarks of Unit Commander (Note 4)

Unit:	Signature:
Date:	

Section 5: Remarks of Base Commander (Note 5)

Base:
Date:

Signature:

Section 6: Remarks by JFSp

Appointment:
Date:

Signature:

Notes

1. This report format follows the guidelines in JSP 435 *Defence Estates Management* and is based on RAF Form 2.
2. The board is usually convened by the infrastructure staff on behalf of Comd NSE (JFSp). The staff will appoint a president and co-opt members in accordance with the guidelines given in JTTP 4-05 *Operational Infrastructure*.
3. Additional pages of findings and recommendations may be added but should be mentioned here in summary. Site and layout diagrams, SME certificates (such as, fire safety) should also be added as annexes.
4. If appropriate.
5. The section is for the base commander or the person who controls the real estate on which the infrastructure stands.

Through life management

Chapter 5 – Design, resource, construct and maintain

501. **Delivery of infrastructure support.** Infrastructure support is delivered through four overlapping activities; design, resource, construct¹ and maintain. These activities are coordinated through planning and management as shown in Figure 5.1. Construct and maintain are inextricably bound together and so are shown as a single activity.

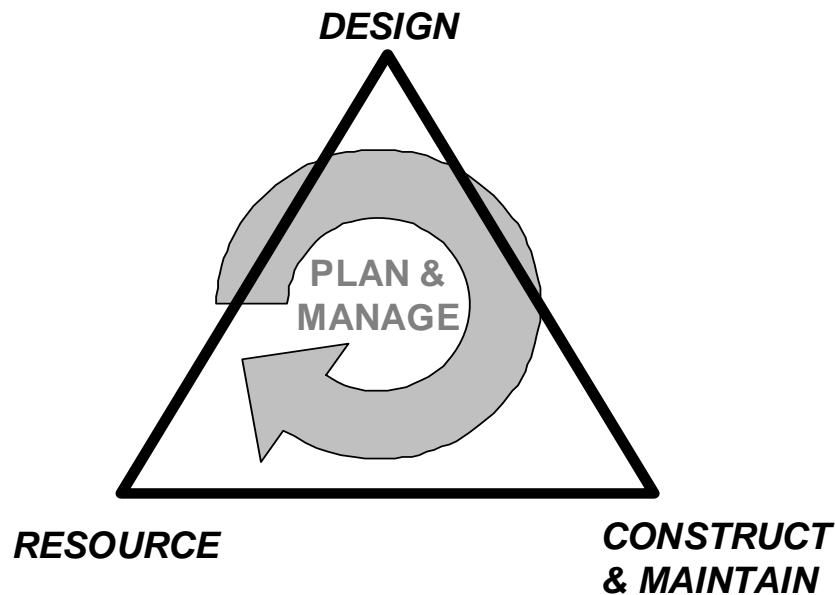


Figure 5.1 – Design, resource, construct and maintain

502. **Infrastructure Delivery Strategy.** Figure 5.2 shows the six methods by which infrastructure support may be delivered. In practice, delivery methods may be combined.² The diagram also shows the central role played by the Military Design Authority (MDA)³ in coordinating the delivery of infrastructure support. On advice from the Joint Force Engineer, the National Support Element (NSE) determines which of these methods is used to procure infrastructure support.

¹ This includes procure/install/assemble.

² See JTTP 4-05.3 *Infrastructure Project Management*.

³ The Military Design Authority is explained later in this Chapter.

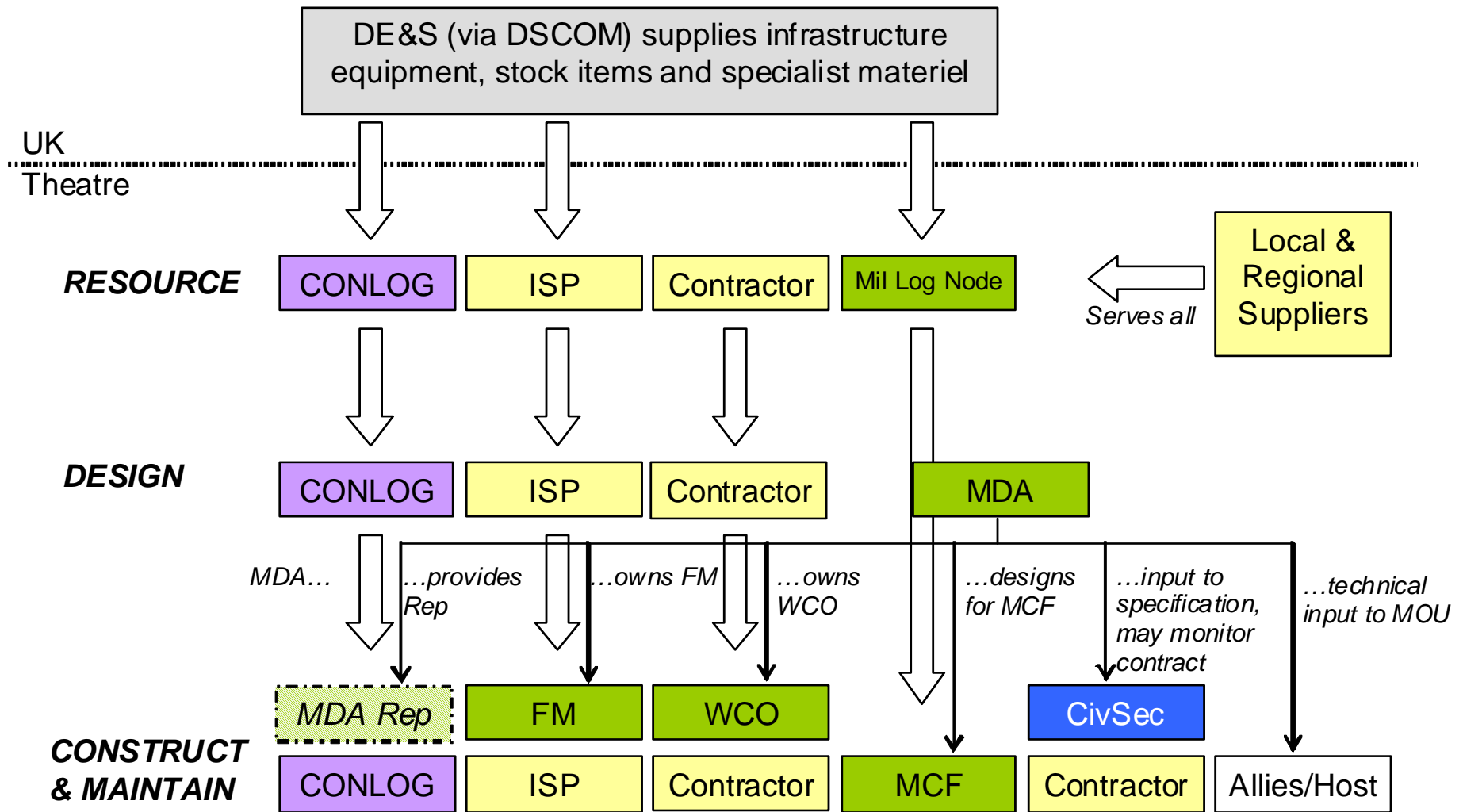


Figure 5.2 – Delivering infrastructure support

503. **Planning and management.** Figure 5.2 is a simplified diagram. In practice, a combination of methods may be used on any single project. Furthermore, within each method, roles may be mixed, for example, a contractor could be required to build from detailed military designs. Regardless of the methods used, the central importance of good planning through the discipline of project management is clear.

504. **Design.** Constructed infrastructure of course requires design, as does the repair or modification of indigenous infrastructure. It is a time consuming activity. Optimised for mobile, rapid use, equipment infrastructure is pre-designed to allow the user simply to *plug-and-play* with the minimum of design effort. However, as equipment systems become static and are aggregated together in a specific location, their collective operation becomes inefficient, wasting manpower and resources. Competent design is required to allow its re-arrangement or replacement/ augmentation with constructed infrastructure to form hybrid solutions, as explained in Chapter 1.

a. **Deployed capability.** Whilst maximum use is made of pre-designed template solutions, these invariably require adjustment to suit local conditions. Even with the use of a reach-back facility, this requires a *deployed* design capability.

b. **Design Authority.** Responsibility for design and the liability that flows from it must always be made clear. This is undertaken through the formal appointment of Design Authorities responsible for specific facilities. Some Original Equipment Manufactures (OEMs) may retain Design Authority for the modification of their equipment – but not its integration into a system once in theatre. Overall Design Authority activity is coordinated in theatre by the Military Design Authority. Amongst other things, the Military Design Authority is also responsible for advising on the level of protection that in-theatre structures are capable of achieving against threat weapons.

505. **Resource.** The timely completion of any element of the operational estate can only be achieved by taking into account the availability of the resources required. Resourcing for infrastructure can be highly complex. It requires specialist knowledge to determine how best to source material from

a wide range of supplies and identify what is, and is not, suitable or, indeed, compliant with appropriate regulatory standards.

a. **Joint Support Chain.** Equipment infrastructure,¹ stock items² used in construction and procured specialist materiel³ can all be supplied through the Joint Support Chain (JSC). They pass through a Logistic Node in theatre before transfer to the construction organisation.

(1) **Costs.** The cost of replacement of stock items should be visible to theatre in order to inform the business case.

(2) **Unit-organic equipment infrastructure.** Front Line Commands (FLCs) ensure that units are appropriately provisioned with equipment infrastructure such as towed generators. As a campaign evolves, Permanent Joint Headquarters (PJHQ) may wish to restrict the use of this equipment in order to ensure coherence with the Theatre Infrastructure Development Directive (TIDD) and Infrastructure Development Plans (IDPs).

(3) **Central equipment infrastructure.** PJHQ authorises the release to theatre of central equipment infrastructure such as configured camps. This is explained in detail in Chapter 3.

b. **Local procurement and fabrication.** In-theatre Logistic Nodes obtain materiel and equipment locally and regionally whenever practical to do so. Similarly some components may be fabricated in-theatre in the Force's workshops.

c. **Contractor supply chain.** Locally engaged contractors have their own supply chain. Some UK-engaged contractors may use the JSC, which they may augment with their own. The responsibility for supply must be made clear in the terms of each contract. It should be noted that if contractors are allowed to use the Joint Supply Chain

¹ Including the spares to maintain them.

² Codified items held by DE&S that are incorporated into a structure. Some items are expendable and are not expected to be returned, such as Hesco gabions.

³ Items for incorporation into a structure, which cannot be obtained locally such as electrical control systems to UK specifications.

then any failure on their part to deliver timely support may be blamed on the MOD's Joint Supply Chain. This makes it difficult to hold a contractor to the contract. Alternatively, reliance purely on the contractor's own, separate supply chain may jeopardise the timely completion of the project. An informed decision must be made.

506. **Construct.** Regardless of the means through which infrastructure is constructed, a common theme is the need for competent project management. This involves the coordination of a wide range of specialist activities, conducted at a specific time and to a specific standard; in addition, the workforce can be very large, transitory, multi-national and under threat of attack.

- a. **Military Construction Force.** Where appropriate, a Military Construction Force (MCF) is used. This is explained later in Chapter 7.
- b. **Works Contract Officer and contractors engaged in-theatre.** Contractors may be engaged in-theatre through a Works Contract Officer (WCO): a named person holding a commercial licence endorsed for the procurement of infrastructure. The role of the Works Contract Officer is explained in Chapter 6.
- c. **Infrastructure Support Provider contractor.** The Infrastructure Support Provider (ISP) contractor is engaged early in the campaign in order to maintain the operational estate. The Infrastructure Support Provider contract can also provide the basis for procurement of new infrastructure. This is explained in Chapter 8.
- d. **Contractor Logistics.** Contractor Logistics (CONLOG) is a multi-function contract that exists outside any particular Operation. It enables contractor support for a wide range of services including infrastructure. It is particularly useful in the initial stages of an operation. If CONLOG is used to provide infrastructure support, its work should be coordinated through a representative from the Military Design Authority. This is covered in more detail in Chapter 6.

e. **Allies engaged through a Memorandum of Understanding.**

Coalition partners and the Host Nation can sometimes provide infrastructure support on a repayment basis, through the use of a Memorandum of Understanding (MOU) or Military Technical Agreement (MTA). Conversely, the UK can be obliged to provide this support to a coalition partner to whom we have promised support. The full and detailed capture of costs is therefore important. This is explained in Chapter 9.

f. **Service provision of infrastructure.** *In extremis*, it is possible to obtain infrastructure support as a packaged *service*. This can be done through the deployed Civil Secretary (CivSec): a person holding a general commercial licence.⁴ However, this is only rarely used in-theatre as experience shows that it is seldom value for money and often fraught with safety and performance problems. Service provision is covered in more detail in Chapter 6.

507. **Maintain.** However constructed, the operational estate must be maintained in a coordinated, cost-effective manner. The operation and maintenance of infrastructure at *static* locations is known as Facilities Management (FM) and is explained in Chapter 8. FM covers all areas of the Joint Operations Area (JOA) therefore a FM organisation is composed of an integrated military and contractor workforce, the balance being determined by site-by-site operational considerations. Everywhere else the use of equipment infrastructure is considered to be *camping-with-equipment* and its management is exercised by units as an Equipment Support (ES) process.

Insight 5-1: Nothing should ever be constructed without careful consideration and a clear plan for how it will be maintained.

⁴ This type of licence specifically prohibits its use in the procurement of infrastructure assets.

Chapter 6 –Using contractors

Section 1 – Intelligent contracting

601. **Contractors are a Force Multiplier.** Wherever practicable the deployed Force should seek to use contractors to provide infrastructure support as they are considered to be a Force Multiplier.

- a. **Capability and skills.** Contractors can bring capability and skills that the Force does not have.
- b. **Capacity.** The use of contractors increases the Infrastructure Support capacity of the Force.
- c. **Free-up military personnel.** The use of contractors frees military personnel for use in less permissive areas of the Joint Operations Area (JOA).
- d. **Innovation.** Contractors can bring innovation, undertaking work more efficiently and bringing in new technology.
- e. **Low-profile access.** Contractors can be deployed to locations where a military presence would serve only to provoke an adverse reaction from the indigenous population.

602. **UK, regional and local contractors.** Contracting companies may be UK-based, regional or local to the joint operations area.

- a. **UK-based companies.** UK companies have a commercial presence in the UK. This makes it easier for senior, UK-based commercial staff to engage with these companies rather than regional or local ones. Commercial risk is often considered to be lower with UK companies and it is easier for the MOD to assess their technical competence and financial soundness. For these reasons, larger, longer-lasting, technically demanding or more contentious contracts are usually let to UK-based companies. These tend to fall into two categories: wide and deep (see Figure 6.1). Almost invariably we will require support from contractors at the outset of an operation and so

need their input to inform our planning. The support we need is wide, spanning a range of capabilities – not just infrastructure support related. Pre-existing contracts, such as the Contractor Logistics (CONLOG) contract, whilst allowing an early start, are not optimised to support the particular circumstances of any specific operation. As an operation progresses the balance of risk between the MOD and contractor may be able to shift, allowing for a better tailored contract to deliver value for money. Such follow-on contracts¹ allow a deeper level of specification and may have a more complex reimbursement mechanism.

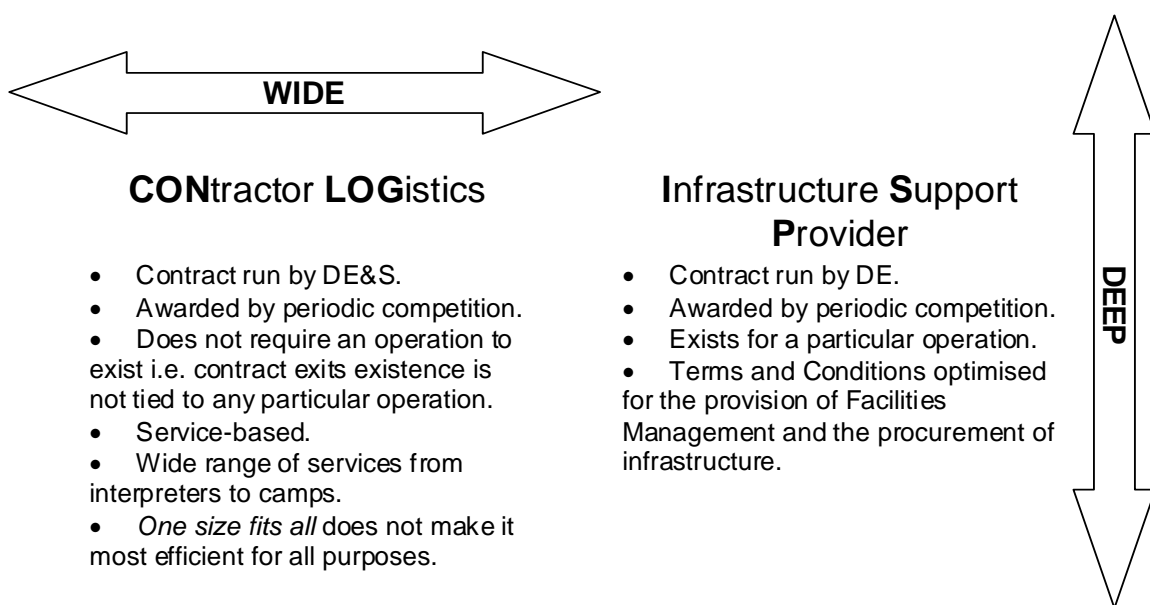


Figure 6.1 – Wide and deep contractor support

b. **Local companies.** With some notable exceptions, local companies are often small in size and may be lacking managerial and technical skills. However, their engagement on appropriate infrastructure work brings significant benefit to the overall mission:

- Revitalising the local economy through employment.
- Raising local skills, promoting long-term stabilisation.

¹ For example, the Infrastructure Support Contract has a pricing mechanism optimised to maintain the operational estate as cheaply as possible whilst minimising the need for Contract monitoring.

- Countering malign influence.
- Fostering open commercial practices.

c. **Third country companies.** Large, regional companies bring significant additional capacity. They often have excellent local knowledge and their own robust supply chains. Extensively used on operations, they have proven to be reliable providers of infrastructure support and value for money.

d. **National status of contractors.** A member of the contractor's staff may be a UK National (UKN), Third Country National (TCN) or Locally Recruited Worker (LRW).² JSP 567 *Contractors Support to Operations* primarily associates policy with the nationality of the individual rather than the origin of the company. It is important not to confuse the nationality of individuals with that of the company.

603. **Understanding the contractor.** It is often difficult for military commanders, at first, to understand the motivation and commercial pressures of a contractor. This can lead to commercial naivety or unwarranted suspicion, or both.

a. **Difference in motivation.** Whilst the military may be motivated by a desire to achieve operational success, contractors are motivated to make a profit. They do this by helping the military achieve operational success. Only when both objectives align is there harmony.

b. **Commercial pressures.** Contractors *must* make money. When a contractor submits a tender with profit priced-in, it should be considered as good practice by the contractor. It is far better for a contractor to do this rather than submit a tender that makes inadequate allowance for profit, as either the contractor will fail part-way through the project, or seek to make money through time-consuming, adversarial claims.

² The term Locally Employed Civilian (LEC) relates only to a local who is employed directly by the MOD.

Insight 6-1: Appreciate the commercial pressures on a contractor. Contractors must make money. If it is unprofitable to do so, they may withdraw and leave the military to undertake the work. The establishment *and maintenance* of a wide pool of contractors keeps cost down, reduces operational risk and gives flexibility to the methods of delivery. It is therefore better to be cooperative rather than adversarial when exercising the contract; seeking partnership and consensus. By being a good client, we are able to retain contractors even when it may be more profitable for them to work for others who may pay more.

604. **Deployed intelligent customer.** UK-based, regional or local, the Force must be capable of engaging all, not merely those companies that have a presence in the UK. Therefore a deployed, competent contract management capability is essential in order to retain the flexibility to engage local and regional contractors *in theatre*. Whilst some element of reachback can be used, the Force must be able to act as an intelligent customer when deployed. Personnel with the requisite contract management skill must be in theatre. They must be able to develop requirements with Subject Matter Expert (SME),³ support and then articulate this requirement and use it as the basis for infrastructure contract procurement. Finally, the Force requires a mechanism to let and supervise the execution of those contracts in theatre,⁴ monitoring performance and ensuring delivery. These key aspects of an intelligent customer are all based on a clear understanding and knowledge of the infrastructure products and services being supplied. See Figure 6.2.

³ Subject Matter Expert (SME) users may be equipment support personnel, such as, medic, and catering staff.

⁴ This will require deployed personnel who hold commercial licences.

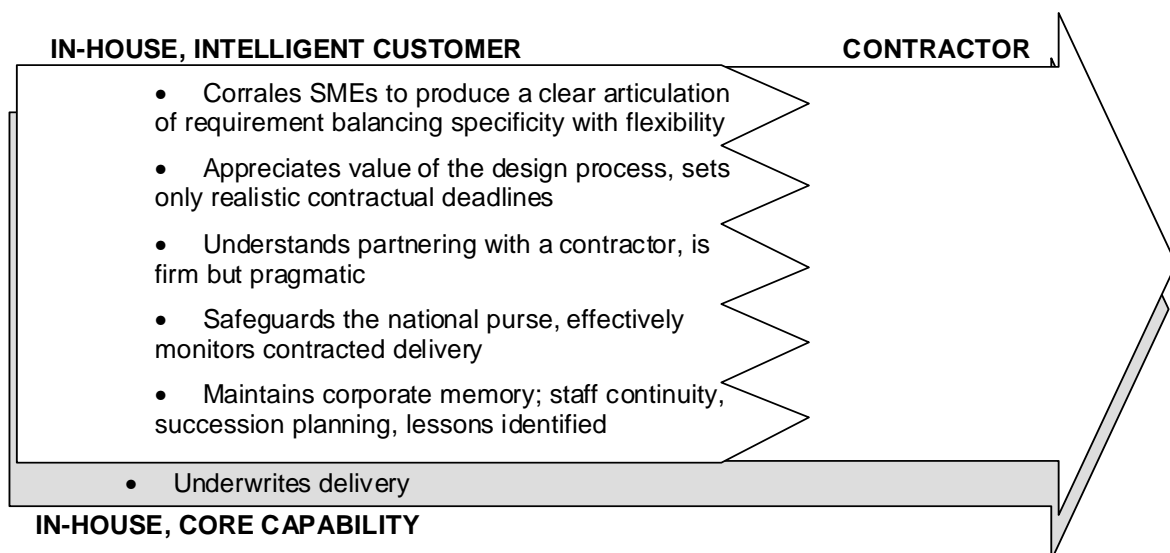


Figure 6.2 – Deployed intelligent customer

Insight 6-2: Be an intelligent customer when deployed. This requires experienced personnel in theatre, who understand the needs of the operation and the infrastructure products and services that are required.

605. **Contract sponsorship and monitoring delivery.** There is a close relationship between sponsorship of a contract and monitoring its delivery.

a. **Contract Sponsor.** The Contract Sponsor (CS) is responsible for acting as a Client on behalf of the Authority,⁵ ensuring that the contract stays within its authorised financial limit and that it is properly managed. The Contract Sponsor should ensure that there is a Contract Manager. He should monitor and manage the contract as a project.⁶ For large and long-term contracts the Contract Manager may be based in the UK, in which case a Theatre Designated Officer (TDO) must be appointed to act on his behalf in theatre. Only the Contract Manager and Theatre Designated Officer may give contract instructions. The Contract Sponsor obtains funds for the contract and sets the budget: the limit-of-liability. The Contract Manager exercises Financial Delegation against this budget and works to the Contract Sponsor informing him of expenditure. The Contract Manager may chose to give only limited Financial Delegation to the Theatre

⁵ That is to say the MOD.

⁶ This is explained in JTTP 4-05.3 *Infrastructure Project Management*.

Theatre Designated Officer, or apply caveats such as a financial limit on variations that may be authorised. Table 6.1 gives some examples of how the roles associated with contract sponsorship and management may be allocated.

Ser	Appointment	ISP Contract	In-theatre Works Contract
(a)	(b)	(c)	(d)
1	Contract Sponsor (Client)	PJHQ J4 Infra	NSE J4 Infra
2	Contract Manager	Comd 170 Engr Gp	OC STRE
3	Theatre Designated Officer	CO Wks Gp/FM	-
4	Commercial Officer	DIO Commercial	WCO
5	Supervising Officers	Wks Gp members	STRE members

Table 6.1 – Examples of Contract Sponsors and Monitors

Insight 6-3: Contractors are not given *orders* through a *chain of command* in the same sense as that which applies to military personnel. Contractors are given contract instructions. These must be valid instructions under the terms of the contract and may incur a cost. Therefore they must be given through the authorised Contract Sponsor.

b. **Monitoring Delivery.** For many contracts, particularly those providing something as complex as infrastructure support, the Contract Sponsor and Theatre Designated Officer require additional support to monitor the delivery of the contract. Supervising Officers (SO) may be appointed to monitor the day-to-day performance of the contract, in particular:

- (1) Ensure the contractor delivers that for which he has been contracted.
- (2) Clarification of the contracted requirement.
- (3) Ensure payment is appropriately authorised.

This requires personnel with an in-depth knowledge of the Terms and Conditions of the contract especially the apportionment of risk and responsibilities between the Authority and the contractor. They must be firm but pragmatic, and experienced in dealing with contractors.

Insight 6-4: Contracts do not, of course, run themselves. Some form of *deployable* Authority structure is required. Deployed personnel must be familiar with the form and function of the contracts used, such as, contract-competent. This requires both training and experience that should ideally be gained away from the operational environment; on-the-job training does not safeguard operational success.

Insight 6-5: Contractors should not be used to monitor contracts on behalf of the Authority. Experience has shown that in disputes between the contractor and the company acting on our behalf, the only thing they can agree on is that the Authority should pay more. Without having any of its own staff able to control the contract, the MOD does indeed end up paying more. The responsibility to the taxpayer cannot be outsourced.

Section 2 – Policy and procedure

606. **Principles of procurement.** The principles of procurement are given by the Office of Government Commerce (OGC).

- a. **Competition.** All procurement should be subject to competition as it provides the best opportunity to procure the goods or services with value for money. There may be a valid exception to this principle, due to the nature of the requirement.

- b. **Value for money.** All procurement should be conducted on a value for money basis. This includes both whole life costs and quality. See Chapter 13.
- c. **Sustainability.** Sustainability issues can be considered where appropriate, but must take cost and affordability into consideration.
- d. **Demonstrably fair.** All procurements should be fair, open and transparent. This is based on the European Union procurement rules about not favouring or putting any potential supplier at a disadvantage.
- e. **Impartial and confidential.** Dealings with contractors must be impartial and their commercial information treated confidentially.
- f. **Procurement Strategy.** It is imperative that a Procurement Strategy is in place.
- g. **Run procurement as a project.** Adopt a project management approach to procurement.
- h. **Expert contract management.** There should be expert and dedicated contract management for the term of the contract.

Insight 6-6: There should be expert and dedicated contract management for the term of the contract.

607. **Contract procedure.** Contracts are indeed run as projects. This is shown in detail in Joint Tactics, Techniques and Procedures (JTTP) 5-05.3 *Infrastructure Project Management*. The key steps are:

- a. Identify the pool of contractors.
- b. Issue an Invitation to Tender (ITT).⁷

⁷ Note it is government policy to abide by EU rules even on operations. Therefore projects over ca £3.5M must be advertised in the *Official Journal of the European Union* (OJEU). DIO advice should be sought if a waiver is required.

- c. Evaluate returned tenders.⁸
- d. Award the contract.
- e. Monitor delivery of the contract.
- f. Complete the contract.

608. **Financial Authority and Commercial Authority.** A contract need not be written; it can be verbal. It is therefore all too easy to enter inadvertently into a contract on behalf of the MOD. To avoid ambiguity and establish control, the MOD only authorises nominated commercial officers to enter into contracts on its behalf. This is quite separate from Financial Authority.

- a. **Financial Authority.** Financial Authority is usually granted to commanders and allows them to spend money. This is explained in more detail in Chapter 12.
- b. **Commercial Authority.** Commercial Authority is granted to allow the holder to enter into a contract on behalf of the MOD.
 - (1) **Commercial licence.** Individually named, commercial licence holders are authorised to set up new contracts.
 - (2) **Commercial delegation.** Individually named, commercial delegation holders are only authorised to give commercial instructions within the bounds of an existing contract.
- c. **Separation of powers.** It is MOD policy not to allow an individual to hold both Commercial and Financial Authority.⁹ The only exception to this is the Government Procurement Card (GPC). Consequently, stringent caveats are applied to its use.

⁸ Financial and qualitative assessments should be conducted separately.

⁹ This is one of the reasons why infrastructure staff must not command the delivery organisation in which commercial delegation is usually vested.

Insight 6-7: Financial and Commercial Authority should not be vested in the same person. Ideally, neither should these be given to someone and his direct subordinate.

d. **Novel or contentious.** Financial and Commercial Authorities may not be exercised for any proposal which is either 'novel or contentious'. This is explained in more detail in Chapter 12.

609. **MOD's Contractor Policy.** The MOD policy for the use of contractors is set out in JSP 567 *Contractor Support to Operations* (Policy). This policy forms the basis of Def Stan 05-129 and Def Con 697, which are formally incorporated into contracts. JSP 567 controls processes such as the deployment of contractors, the management of contractor personnel in theatre (although not specifically the management of the contract *per se*) and the use of armed protection. The policy for the contracts themselves is given the Acquisition Operating Framework (AOF). Some key issues addressed by these policy documents are:

a. **Use of armed protection by contractors.** JSP 567 stipulates how a contractor may make sub-contract arrangements for armed protection.¹⁰ No contract may be let without first confirming that the contractor complies with MOD policy in this regard. This requires a Ministerial submission for each and every occurrence.

b. **Single Tender Action.** Often, in the hope of speeding up the procurement of infrastructure, Single Tender Action is planned (selecting a single contractor without competition). Policy in the Acquisition Operating Framework¹¹ states:

'Open and fair competition remains the bedrock of MOD acquisition policy, ... It is the mechanism by which MOD secures the best value for money solution to its acquisition requirements. It enables any competent supplier to tender for MOD work, without discrimination or favour, and thereby has the added advantage of stimulating innovation and efficiency.'

¹⁰ If the contractor's personnel legally hold weapons for self-protection, the company does not constitute a Private Security Company as defined in JSP 567 *Contractor Support to Operations*.

¹¹ Commercial Toolkit.

The Acquisition Operating Framework advises 'no more than six' companies to tender, but this is not practical for smaller value contracts, and, indeed, almost impossible in operational theatres. Each contract is considered case-by-case and if there are not three suitable firms then, on Defence Infrastructure Organisation (DIO) advice, it may be appropriate to consider reduced competition or Single Tender Action. It has always been difficult to get good contractors in operational theatres. It is important to encourage competition to avoid creating the situation where we only have one or two firms bidding for projects in theatre. In addition to such a scenario, allowing them to attempt to dictate terms and conditions and price, it also heightens the risk of over-burdening a single company and having a negative impact on their performance. Therefore authority for Single Tender Action must be specifically sought as early as possible and not assumed as of right.

610. **Deployable Works Commercial Toolkit.** DIO produces the Deployable Works Commercial Toolkit (DWCT). Based on the Acquisition Operating Framework, it incorporates MOD policy appropriate to infrastructure contracts. It includes template contracts, Invitation to Tender letters and other standard forms. Using the DWCT therefore ensures that contracts let in theatre comply with MOD commercial policy.

611. **Record keeping.** Commercial records must be kept for six years after the formal closure of a contract (or longer if there is a design liability). Given the fluid nature of the operational environment and the rapid change over of staff, this can be difficult to achieve in practice. PJHQ will usually give direction on how this is to be undertaken.

612. **Propriety and fraud.** JSP 462 *Financial Management Policy Manual* gives details on financial propriety and avoiding fraud. This includes guidance on accepting gifts and the use of a hospitality book within the National Support Element (NSE).

Section 3 – Procurement and contract strategy

613. **Determining procurement and contract strategy.** The many different routes to the procurement of infrastructure support are shown in Figure 5.2. The most appropriate route is selected on a case-by-case basis, taking into account the operational plan and the Infrastructure Programme (see Chapter 4). It is for PJHQ and their in-theatre infrastructure representatives to determine the procurement route on the basis of advice received (see Figure 2.6). Once the procurement route is chosen, the contracting strategy itself is usually left to the Joint Force Engineer to determine, but with DIO concurrence. In practice, however, both procurement and contracting strategies are very closely linked and are settled upon together.

614. **Elements of a Procurement and Contract Strategy.** The strategy, expressed in the Theatre Infrastructure Development Directive (TIDD) and Infrastructure Programme, should:

- a. Have a clear sourcing strategy; the engagement of which contractors will be sought?
- b. Identify the types of contract to be used.
- c. Have considered the options for leveraging existing contracts and collaborative opportunities with allies.
- d. Clarify responsibility for Contract Sponsorship.
- e. Determine how contracts will be monitored, identifying the resources required to do this.

615. **Types of contract.** There are a number of general types of contract through which infrastructure support is obtained:

- a. **Framework.** A framework contract is a complex arrangement that allows flexibility in *what* can be done, by explaining *how* pricing and risk will be apportioned. For example, the Infrastructure Support Provider (ISP) contract is a modular contract that packages work into

different types with various pricing mechanisms. These contracts have a base level of work (often maintenance). This type of contract can then be used to undertake a variety of additional tasks as long as financial authority is given for each; a new contract need not be let each time.

b. **Works.** These are the usual contract tools for engaging discrete, specific construction tasks.

c. **Enabling.** Enabling contracts are usually set up for the supply of infrastructure material or fabricated items of low value/complexity.¹² A pricing schedule is agreed on the basis of anticipated quantities to be ordered.

d. **Service.** Unlike the other types of contract, service contracts do not vest ownership of infrastructure with the MOD; the provider of the service owns it. A contractor is paid to provide and run a facility for the Force's use. The CONLOG contract and Port Agency Contract (PAC) are examples of a service contract. They are explained in more detail in Annexes 6A and 6B respectively.

(1) **Advantages.** Service contracts can provide a simple solution; a single contract could provide the facility and meet all the service support needs (for example, catering and laundry). At the end of the operation, there is little to do but terminate or transfer the contract.

(2) **Disadvantages.** If the contractor under-performs or fails in one aspect, it is difficult and expensive to replace that element; all the *eggs are in one basket*. It is not a question simply of bringing in say, new chefs. A new kitchen may be needed. Unless a single service contract is used for the entire operation, there will be duplication in maintenance teams and staff levels, driving up the numbers of the Total Force. In the past this type of contract has led to questionable safety standards and disputes over what is acceptable and who is responsible for safety checks. If the duration of the operation is unknown, the contractor will set a rate

¹² Enabling contracts are also described in JTTP 4-05.3 *Infrastructure Project Management*.

that pays for his investment over the fixed life of the contract. If, as in almost every case to date, the operation runs past that initial date (due to the operational fog), contract extensions are particularly poor value for money.

616. **Building and maintaining a contractor base.** Detailed knowledge of in-theatre contractors will be difficult to establish in the early stages of a deployment. Language and communication difficulties along with local corruption may all be encountered. Nevertheless, a database of suitable contractors must be built up as quickly as possible. Existing local works departments, or government agencies, will be useful in this regard, as will other coalition partners, NATO, and UK Non Government Organisations. Prospective contractors should ideally be visited in order to make an assessment of the standard of work and overall level of competence. A pre-qualification questionnaire is considered best practice. In some circumstances it may be appropriate to issue a request for Expressions of Interest (EOI) in order to make contractors aware of the opportunities available and to widen and refine the pool of potential contractors. Contractor selection and evaluation should be a continuous process.

Insight 6-8: Some companies have more than one contract with the MOD. It is important to understand through which specific contract any action is being sought, as both the terms and conditions and payment mechanisms may vary from contract to contract.

617. **Partnership and competition.** Fostering a partnership approach to contracting leads to greatly improved efficiency and speed as the contractor starts to understand a Force's requirements and acceptable standards of provision. However, partnerships can only form if contractors can see a future with the UK Force. This is not always possible given the uncertain duration of military operations. The desire to establish partnerships must not, however, lead to complacency and so contractor competition must remain a cornerstone of our strategy in order to ensure value for money.

618. **Bi- and multi-national arrangements.** These are explained in more detail in Chapter 9. It should be noted, however, that once the decision is

taken to use this procurement route and arrange for others to undertake the work on our behalf, there is very little scope to influence contracting strategy.

619. **Risk.** Contracts are about the apportionment of risk between two parties. A good contract places a risk with the party best able to deal with it. Passing risk unnecessarily onto a contractor is costly and poor value for money. Therefore risk is one of the principal factors in determining a contract strategy and should be considered both at the programme and project level.

a. **Programme level risk.** Programme level risks involve larger operational considerations such as the robustness of supply chains and the impact of political and coalition factors. It is also important to ensure that, across a programme, we avoid over-reliance on a single contractor and that there is a contingency plan for the withdrawal (partial or full) of contracted support.

b. **Project level risk.** Project level risks include those traditionally associated with infrastructure work, such as unforeseen ground conditions and weather. However, on the operational estate there are other project level risks that are not normally so significant in contracting elsewhere. Although many in total, there are four *major* additional risks:

(1) **Hazardous operational environment.** The risk associated with undertaking a contract in a hazardous operational environment (threat from the actions of an adversary). This can vary from site to site.

(2) **Changing requirement.** Secondly, and often overlooked, is the likely maturity of the requirement and the need for variations when work is underway.

(3) **Contractor competence.** Contractor competence is also a risk, particularly if the work is complex (where it has a large electrical component) or if local contractors are used.

(4) **Ability to monitor delivery.** Usually the last major additional risk is the ability of the Authority to monitor delivery

against the contract. For example, if a financial incentive is promised for early delivery, it is important to consider how to cope with contractor down-time due to indirect fire (IDF) attacks. What extension of time should be given? If this cannot be closely monitored and verified, the facility may be delivered later than originally intended, yet the contractor may still claim the entitled money for 'early' delivery.

620. **Time, cost and performance.** Some contracting options are faster to deliver than others, but may be more expensive or take greater risk with the quality/performance of the product. A balance must be struck appropriate to the specific requirement. As shown in Figure 2.5, these factors must also be considered in their specific operational context.

621. **Threat and the permissiveness of the environment.** The freedom of movement around theatre will impact differently on locals, UK-based contractors and personnel who monitor the contract.

622. **Security.** Some work areas or projects may have sensitive security issues such as building headquarters or detention facilities. This will influence the choice of contractor or require the use of a nominated specialist sub-contractor.

623. **Complexity and contractor capability.** In order to expand the contractor base to include less technically competent, local contractors it may be necessary, at least initially, to avoid contracts framed around output-based specifications and instead use more traditional designs and bills of quantities/schedules of rates.

624. **Availability of materials and robustness of supply chains.** The availability of materials and the robustness of their supply will influence the contract strategy. The contractor's own supply chain may be less (or more) reliable than that of the Force. If the materials and equipment for the project are being brought in by the military, any delays in supply that impact on the project cannot be at the contractor's risk.

625. **Defects Liability.** It is usual practice in construction projects, generally, to insist that the contractor provide a Defects Liability period (often

up to 12 months). Final payment for the work is held over until the end of that period in order to ensure that any defects that come to light are repaired at the contractor's expense. This can be difficult to enforce especially during the early stages of a deployment.

626. **Maintenance.** It is often prudent (although not always practical) to have the same company maintain a facility that built it. Not only is the company already familiar with the facility, the responsibility for any defects is also more readily attributable.

627. **Stabilisation, and 'locals first'.** As explained earlier, the use of local contractors can have particularly beneficial value in stabilisation operations. It may be operational policy to consider the use of local contractors first. This is never an absolute instruction and a balance must be struck, see Chapter 1.

628. **Forms of contract.** Table 6.2 lists the common forms of contract that may be used and the different levels of project level risk associated with each. Term Contracts and Cost Reimbursement Contracts are not normally within the delegated authority of in-theatre commercial officers (Works Contract Officers).

Ser	Contract form	Risk of change in cost	Cost of changes	Risk of change in time	Risk of inadequate quality
(a)	(b)	(c)	(d)	(e)	(f)
1	Lump sum – Drawings and specification	Low	High	Medium	Low
2	Lump sum – Performance specification	Medium	High	Medium	Medium
3	Lump sum – Schedule of works	Low	High	Medium	Low
4	Lump sum – Bill of quantities	Low	Medium	Medium	Low
5	Lump sum – Bill of approximate quantities	Medium	Medium	Medium	Medium
6	Lump sum maintenance contracts	Low	Medium	Medium	Low
7	Term contracts – Daywork	High	Medium	Medium	Medium
8	Term contracts – Measured	Medium	Medium	Medium	Medium
9	Term contracts – Specialist	Medium	Medium	Medium	Medium
10	Cost reimbursement – Percentage fee	High	High	High	Medium
11	Cost reimbursement – Fixed fee	High	High	High	Medium
12	Cost reimbursement – Fluctuating fee	High	Medium	High	Medium

13	Cost reimbursement – Variable fee	High	Medium	High	Medium
14	Cost reimbursement – Target cost	High	Medium	High	Medium
15	Jobbing – (On basis of lump sum quotation)	Low	High	Medium	Medium
16	Directly employed labour	Low	Medium	Medium	Medium

Table 6.2 – Project risk in different forms of contract

Section 4 – Contract management

629. **The Force's Contracting Staff.** There are a number of contracting specialist staff available to a Force.

a. **Infrastructure Commercial Licence Holders.** Personnel who hold a commercial licence:

(1) **Defence Infrastructure Organisation staff.** Occasionally DIO staff may be deployed. They are few and their presence in Theatre cannot always be assumed.

(2) **Works Contract Officer.** The Works Contract Officer (WCO) is a military officer who holds a commercial licence from DIO. The licence usually only allows the use of lump sum contracts of fairly limited value. However, on a case-by-case basis both caveats may be lifted.

b. **Commercial delegation holders.** A commercial delegation holder is authorised to give commercial instructions within the bounds of an existing contract such the Infrastructure Support Provider (ISP) contract.

c. **Service commercial licence holders.** The in-theatre CivSec (or a member of his staff) holds a service-only commercial licence. In some circumstances it can be used to obtain infrastructure support as long as it remains within the definition of a *service* (see earlier).

d. **Low value Purchase Officer.** This is a person holding a personal letter of commercial delegation that authorises only the purchase of material. This is explained in more detail in JTTP 4-05.3.

630. **Assisting the contracting staff.** There are only ever very few commercial officers in theatre. They should be assisted in their tasks.

a. **Supervising Officer.** Supervising Officers (SO) need to understand both the Terms and Conditions of the contract and have a sound technical understanding of the work. On large projects the

Supervising Officer may be an RE officer, however, normally this is undertaken to RE Clerks-of-Works. They are responsible to the Works Contract Officer for their work on the contract.

b. **Assistant Supervising Officer.** Assistant Supervising Officers (ASO) may also be appointed. On infrastructure projects they are likely to be skilled artisans with a sound knowledge of the technical issues of the work.

Insight 6-9: The Commercial Authority held by Works Contract Officers cannot be sub-delegated. Whilst Supervising Officers can work on their behalf, the Works Contract Officers retain commercial authority and responsibility.

631. **Project and contract management.** As explained earlier, contracts are run as projects. This can lead to confusion between what is meant by Contract Management, and by Project Management of the work itself. There must be clear articulation of who is responsible to whom and for what. This should be laid out in the Procurement and Contracting strategy. JTTP 4-05.3 *Infrastructure Project Management* gives example management models.

a. **Contract management.** The commercial officer engaging the contractor is responsible to the Contract Sponsor for the management of the contract and for staying within authorised financial limits. This responsibility may also pass through his chain-of-command.

b. **Project management.** The Project Manager is responsible for delivering the outputs of the project to the Programme Manager.

632. **Paying the contractor.** A contractor should be promptly paid for any work done in accordance with the contract. Payment should not be withheld without due authority. However, the commercial officer managing the contract must ensure that payment is *only authorised* if the work has been done in accordance with the contract.

a. **Payment mechanism.** The Contract Sponsor should ensure that there is an appropriate mechanism in place to validate the contractors'

requests for payment and then pay the contractor. In the early stages of a deployment, this may mean handling very large sums of cash in theatre.

b. **Liquidated damages.** Clauses that seek to impose liquidated damages on a contractor require the Authority to demonstrate that such damages have arisen as a result solely of the under-performance by that contractor. This is extremely difficult to prove in the operational environment. It is also highly resource intensive. Furthermore, the relevant calculation must be made available to all those tendering for the work. They will then price-in the risk associated with this. Liquidated damages must never be included in a contract without prior approval from DIO.

Insight 6-10: Penalty clauses are not enforceable under English Civil Law and therefore cannot feature in MOD contracts. However, under-performance against contractual deliverables may be remedied through withholding payment. Evidence will be needed hence the requirement for Authority monitoring throughout. In an inadequately supervised contract it is impossible to safeguard value for money.

c. **Payment in advance.** Early in operational deployments, it is sometimes necessary to pay a contractor (particularly locals) a proportion of the price in advance in order to enable him to buy materials or equipment. Such payment should only be made exceptionally and only with specific concurrence by DIO.

d. **Milestone Payment Schedule.** Payment to a contractor may be arranged in accordance with a Milestone Payment Schedule (MPS). Milestones must be set against achievements that can be readily defined and assessed as complete. The payments must reflect the agreed total value of the work on completion of a given stage, less previous payments. Milestones should ideally be arranged to occur monthly. Payment milestones can be specified by the Authority or left for the tenderer to insert in his bid. If a defects period is required, one milestone is referred to as 'Completion of Works (Release of retention)' and a second is 'End of Warranty Period/Agreement of

Final Account (whichever is later) (Release of final retention)'. Each milestone description should begin 'Completion of....' and must not refer to percentage completions, but rather something more tangible. When evaluating the MPS provided by a contractor it must be checked to ensure that it is not *front-loaded*.¹ Guidance on milestone payments is given in the Deployable Works Commercial Toolkit.

e. **Stay within the limit-of-liability.** When Financial Authority is given for a contract, a Limit-of-Liability (LoL) is set. Those managing the contract must ensure that they stay within this limit. This is described further in Chapter 12.

Insight 6-11: When planning a contract, determine beforehand:

1. Who has the authority and capability of checking to confirm that the work/services are in accordance with the contract, and hence of giving technical authorisation for payment.
2. Who has the authority to release funds, Financial Authorisation for payment.
3. Who monitors contractual spend against the authorised budget.

633. **Variation Orders and Site Instructions.** Unfortunately, it is often usual to have to make minor changes to the contract once it is underway. These changes must be carefully controlled by the WCO. Site Instructions (SIs) should be followed up with formal Variation Orders (VOs). Any Variation Orders that incurs a cost or time delay must be approved by the person giving Financial Authority for the contract. The cost of the Variation Orders must first be calculated. Control of Variation Orders and consequent Configuration Control² are key roles of the Works Contract Officer in Contract Management.

634. **Communication with the contractor.** As explained above, any communication with a contractor may be inadvertently taken to be a

¹ The sharp contracting practice whereby costs are recovered earlier than merited by artificially inflating those due earlier in the MPS.

² See JTTP 4-05.3 *Infrastructure Project Management*.

commercial instruction. To avoid this, all communication should be through the Contract Sponsor.

- a. **Without commitment.** The phrase 'without commitment' should be used as the basis for talks before going to contract.
- b. **Without prejudice.** The phrase 'without prejudice' should be used when under contract.
- c. **Get it in writing.** To avoid misrepresentation, record all instructions in writing.

635. **Contract closure.** On closure of the contract, in addition to making the final payment to contractor:

- a. **Contract file.** The Works Contract Officer closes the contract file and archives it in accordance with PJHQ's instructions.
- b. **Health and Safety File.** The Project Manager completes the Health and Safety File for the facility and passes it, via the Contract Sponsor, to those responsible for the maintenance of the facility. In addition, a copy of the Health and Safety File should be sent to the Chief Environmental and Safety Officer (CESO) (Chief of Joint Operations)'s office at PJHQ.
- c. **Project Evaluation.** The Contract Sponsor is responsible for arranging for a Project Evaluation (PE), if appropriate.

Annex 6A – Contractor Logistics contract¹

6A1. **Contractor Logistics.** The Contractor Logistics (CONLOG) contract is a service-based contract that exists independently of any specific operation. It is competitively awarded on a rolling period basis. It allows PJHQ to use a preferred contractor for a very wide range of service support to deployed operations without the need to tender for each provision. This also allows the CONLOG contractor to embed staff within the J4 Division of PJHQ to help plan the support of operations.

6A2. **Services provided.** The CONLOG contract has wide-ranging pre-agreed Terms and Conditions compared to other bespoke construction contracts. It is intended to provide PJHQ with a flexible, rapidly deployable, delivery option for a very diverse range of services, from the employment of interpreters, through low-loader transport to the erection of field accommodation.

6A3. **Theatre tasking of Contractor Logistics.** If theatre wishes to use CONLOG, it must first produce a clear statement of requirement. This is refined by PJHQ's Contract Support to Operations (CSO) desk before being passed to the CONLOG contractor. The contractor (through the CSO desk) gives theatre an estimate of how much the work will cost and how long it will take. This may be a Rough Order Magnitude (ROM) 20, ROM 10 or a Commercial Proposal, and is for a fixed rate plus an estimate of the ascertained costs (for example, transport, and plant hire). If this cost exceeds theatre's authorised financial limit then a business case is required from theatre. The CONLOG desk may help to prepare this. Before CONLOG can be used, theatre must demonstrate why any other competitive in-theatre solution is either not possible or not value for money. Cost reductions can be achieved through competition as the requirement matures. Once theatre receives financial approval, theatre passes this back to the CONLOG desk to allow the contractor to be engaged.

6A4. **Controlling Contractor Logistics.** As explained in Chapter 4, and shown in Figure 5.2, the detailed Project Management arrangements must be agreed and responsibilities made clear. If CONLOG is to be used to deliver infrastructure support, it is good practice to nominate a Theatre Designated

¹ See JSP 567 *Contractor Support for Operations*, (5th Edition).

Officer (TDO) or other representative from the Works Group to ensure CONLOG work is coordinated with other work underway in theatre.

6A5. **When it is appropriate to use Contractor Logistics.** In a mature theatre where an Infrastructure Support Provider (ISP) contractor is engaged there is likely to be reduced requirement to employ CONLOG as the Infrastructure Support Provider contract will have been negotiated with a better apportionment of risk and hence better value for money. Nevertheless, the decision to use CONLOG is influenced by a number of considerations:

- a. **Time.** CONLOG may be considered if there is insufficient time to conduct a normal commercial competition.
- b. **Challenge of the project and capability of the contractor base.** If the technical complexity or scale of the project is beyond the capability of *all* other available contractors, yet within the skill of the CONLOG contractor, then it may be considered. Similarly, if the project requires specific knowledge that *only* the CONLOG contractor has, then it may be considered.
- c. **Service delivery.** Where the requirement is best met by an integrated service provision then CONLOG may be considered. This is true for projects that require the integration of multiple non-infrastructure capabilities such as specialist equipment and operators. It has been successfully used to provide a water bottling service and vehicle deep repair service.
- d. **Security.** CONLOG may be considered where operational security rules out the use of all other contractors. However, it must be borne in mind that not all the contractors that CONLOG normally uses have full SC or DV clearance. Bringing in additional contractors who have this clearance, whether for CONLOG or any other contractor, will be expensive. It is therefore usually better, if possible, to restructure the project in order to reduce the need for contractors with a high security clearance.

- e. **Non-military profile.** Subject to the safety of contractor personnel, CONLOG may be used where the local security situation would be aggravated by having an overtly military presence.

- f. **Poorly defined or uncertain requirement.** The open book nature of the CONLOG pricing mechanism makes it well-suited to use on a project with a poorly defined or uncertain requirement.

Annex 6B – Port Agency Contract

6B1. The Port Agency Contract. The Port Agency Contract (PAC) contract is a service-based contract that exists independently of any specific operation. The PAC engages a specialist maritime logistic company to arrange or provide support to any deployed maritime force. The PAC ensures that a local agent is nominated to manage and oversee all aspects of a ship's port visit. It is also the framework through which other support arrangements are made with the US Navy, other NATO nations and a range of commercial partners.¹

6B2. Use of Port Agency Contract to obtain infrastructure support. The PAC is sponsored and managed by Navy Command. It is possible, through this Front Line Command (FLC), to arrange infrastructure support at a port using the PAC.

¹ BRd 2002 *Maritime Operational Logistics* Volume 1.

Chapter 7 –Military infrastructure engineering

Section 1 – Military engineering

701. Infrastructure support in the context of military engineering.

Military engineers support the Force with a wide range of capabilities of which infrastructure support is merely a component.¹ This is shown in Figure 7.1. However, this does not mean that *all* infrastructure support is *solely* a sub-set of military engineering, merely that it is one of the support capabilities that are available to the Force.

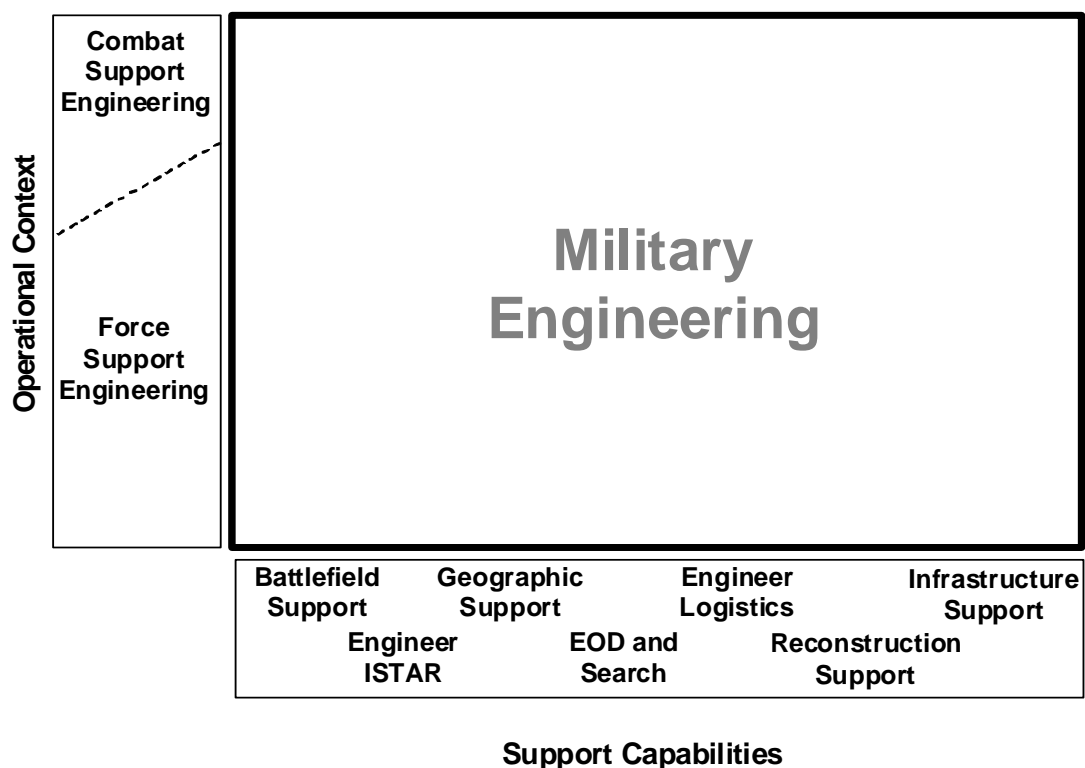


Figure 7.1 – Infrastructure support in the context of military engineering

¹ Joint Force Engineer Operating Doctrine.

702. **Key tenets of military infrastructure support.** The military infrastructure support provided to the Force is employed following three key tenets:

- a. **Royal Engineers underwrite delivery of infrastructure support.** The mission must not be jeopardised through a failure of infrastructure support. REs ensure either that support is provided or that commanders understand the risks taken. This is explained in more detail later.
- b. **Design, resource, construct and maintain.** The functions required to deliver infrastructure support are described in Chapter 5. Military engineering units retain the ability to provide assured support by being able to undertake all four functions, design, resource, construct and maintain. This includes the ability to plan, manage and supervise delivery through others (such as contractors).
- c. **Enable the deployed Force to be an intelligent customer.** Increased use of contractors increases the importance of acting as an intelligent customer when deployed. Military engineers play a key role in advising and enabling the Force to be an intelligent customer. This is described in Chapter 6.

Insight 7-1: The tenets of military infrastructure support are:

1. REs underwrite delivery of infrastructure support.
2. Design, resource, construct, and maintain.
3. Enable the deployed Force to be an intelligent customer.

703. **Environments where military infrastructure support is required.** The level of threat varies across the battlespace and this may change over time. Both the availability and capability of contractors will also vary in time and location. As shown in Figure 7.2, *military* capability is used to underwrite the delivery of infrastructure support, primarily in three or four operational environments.

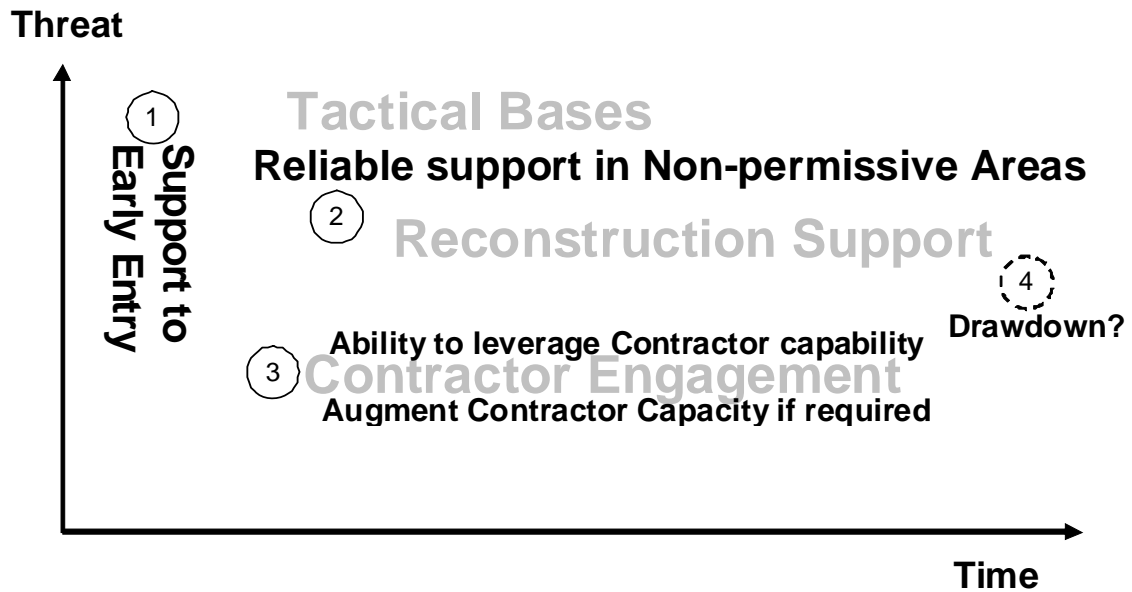


Figure 7.2 – Environments in which *military* support is needed

- a. **Support to early entry.** The deployed Force needs increased support during early entry. Even if there is already a host nation or coalition partner, a shortage of contractors and uncertainty over security arrangements will drive the need for military support.
- b. **Reliable support in non-permissive areas.** Whether providing support to tactical bases or reconstruction support, military infrastructure capability is required in the non-permissive, hazardous areas of the battlespace for as long as they exist.
- c. **Leveraging and augmenting contractor capability.** Contracts do not run themselves and we cannot guarantee the presence in theatre of civil servant contracting staff in sufficient numbers to allow a Force to engage and monitor the numbers of contractors it may need. Military infrastructure specialists may be required to help leverage contractor capability. Furthermore, in cases where there is insufficient contractor capability available, military infrastructure delivery capability is needed.
- d. **Drawdown.** Subject to the level of operational threat. Military support may be needed during drawdown.

704. **Joint Force Engineer.** The NATO definition of the Joint Force Engineer (JFEngr) is: *'The JFEngr is the principal engineer advisor to the Joint Force Commander (JFC) on all military engineer issues. Although he will not act as a commander, he will, on behalf of the JFC, have coordinating and technical authority over the employment of military engineer assets throughout the Joint Force, in order to ensure capabilities and resources are used most effectively.'*² This makes the JFEngr a key figure in the *delivery* of infrastructure support.

705. **Military engineering units and personnel.** Although essentially Land forces, military engineering units provide direct, organic support to the other Services through 12 (Air Sp) Engr Gp and through the engineer regiment assigned to 3 Cdo Bde.

Insight 7-2: Knowledge is the lightest and most rapidly deployed capability. Even without *any* equipment, it is possible for the Force to obtain infrastructure support through the contracting and engineering skills of its military engineers.

a. **Infrastructure specialists.** The principle infrastructure specialist unit is a Works Group (Wks Gp). It has sub-units known as Specialist Teams RE (STREs). Most Wks Gps are assigned to 170 (Infra Sp) Engr Gp (see Annex 7A). The Military Design Authority (MDA) function, as described in Chapter 5, is *usually* undertaken by a works group or STRE.

(1) **Professionally Qualified Engineers.** Professionally Qualified Engineers (PQEs) lead Wks Gps and STREs. They provide the Force with its most technically adroit infrastructure engineering support.

(2) **Garrison Engineers.** Garrison Engineers (GEs) are specialists in contract and facilities management. A Works Contract Officer (WCO) is usually an experienced Garrison Engineer.

² ATP-52(B) *Land Force Military Engineer Doctrine*

(3) **Clerks-of-Works and Military Plant Foremen.** These are technically trained soldiers who are capable of infrastructure design and of acting as contract Supervising Officers (SOs).

b. **Generalists.** Royal Engineer regiments and squadrons generally have personnel trained in both combat engineering and construction. They usually undertake the Military Construction Force (MCF) function.

(1) **RE Officers.** Royal Engineer officers plan and manage the MCF.

(2) **Artisans.** Royal Engineer soldiers have a wide range of construction and maintenance skills.

706. **Engineer and Logistic Staff Corps.** The Engineer and Logistic Staff Corps (E&LSC), also known simply as the *Staff Corps*, provides a network of advisors to Defence and, in recent times, Other Government Departments (ODGs) through the MOD. Access to advice from the E&LSC can be obtained through HQ EinC(A). The E&LSC members are chief executives, directors and very senior technical or operational managers of engineering, transport, communications and logistics firms or organisations. They have specific expertise in the following areas:

a. **Operations and projects.** Individual members of the E&LSC provide in-theatre technical consultancy advice on: design and project management best practice, logistic support and the supply chain, the use of sponsored reserves and the private sector on operations, post-conflict reconstruction and stabilisation, and post-project or operational evaluation.

b. **Procurement and contract strategy.** Their extensive commercial experience is particularly useful in providing advice on procurement strategies for engineer or logistic equipment and services.

c. **Worldwide data.** The E&LSC can provide worldwide infrastructure, geographic and environmental data.

707. **Infrastructure support by non-Royal Engineer units.** Limited infrastructure support is also available from non-RE units.

- a. **5001 Sqn RAF.** Personnel from 5001 Sqn RAF erect and maintain aircraft shelters and other specialist air support infrastructure.
- b. **RLC Pioneers.** Some RLC personnel are trained in basic construction techniques.
- c. **Infantry and RAC Assault Pioneers.** Some infantry personnel are trained in basic construction techniques.

Insight 7-3: Howsoever infrastructure support is provided, efficient coordination across the force is only possible through the Joint Force Engineer.

Section 2 – Underwriting the delivery of infrastructure support

708. **Contractors' appetite for risk.** Contractors have proven their willingness to remain alongside a deployed Force in all but the most hazardous environments. However, this cannot be taken for granted especially in the early stages of an operation when the risks of a particular situation are less well understood by contractors. They have a duty of care to their employees. Even if individual members of staff are happy to remain in theatre, the company's executives may not be happy for them to do so.

Insight 7-4: Contractors are most cautious and unpredictable when they do not have a clear understanding of the threat to their people – not when it is hazardous but the risks are well understood. Therefore the most difficult times for a contractor are during early entry to a new theatre and when the operational threat is rapidly changing.

709. **When contracts fail.** Sometimes a contractor (or, indeed, military commander) may feel that the risk is too great to use contracted personnel at a specific location, in which case the contract would simply cease to operate at that site. However, experience has shown that it is more likely that some

members of staff consider the risk too great and they may depart theatre. This may leave the contractor with fewer staff than are needed to discharge the contract adequately. Without viable, measurable performance indicators, it is hard to prove when the contract has actually 'failed' as such; only a poorer, less responsive service is delivered. Whether officially 'failed' or not, rather than adopt an adversarial, contractually rigid approach with the contractor, it is often better to bolster the contractor with a limited number of military personnel in order to avoid having to take over the entire role. Although this is a contractually *messy* arrangement it is often a more pragmatic solution than declaring the contractor to be in default and terminating the contract.

710. **Underwrite delivery and understand risk.** Military engineers must therefore be able to underwrite the delivery of infrastructure support on operations, albeit in a reduced capacity. However, this does not necessarily mean that RE personnel must undertake *all* such work. Nor does it simply mean that an RE 'insurance policy' is invoked on failure of a contract. Underwriting support means balancing risk with the cost of assured response.

- a. **Identify what infrastructure support is required.** Before a problem arises, military engineers are the best-placed, most infrastructure-competent personnel available to the Force. They identify what support is required and the priority that should be afforded to it.
- b. **Prepare a contingency plan.** The JFEngr will prepare a contingency plan for the delivery of infrastructure support when it is appropriate to do so.
- c. **Monitor and supervise delivery.** Personnel other than REs may be co-opted to undertake some or all of the work. However, military engineers must assess their competence to undertake the work and may have to monitor or supervise them, possibly after a short period of in-theatre training.
- d. **Articulate the residual risk.** Military engineers advise commanders on the residual risk of under-resourcing the delivery of

support, for example, fire, structural collapse, electrocution, and loss of power during an operation. Commanders may then make an informed decision. This is explained in more detail in Chapter 10.

Annex 7A – 170 (Infra Sp) Engr Gp

7A1. **Role.** 170 (Infra Sp) Engr Gp delivers an operational infrastructure service to Defence and Other Government Departments. It provides Works Groups, Specialist Teams RE (STREs) and individual specialists to work on the operational estate and to provide support to stabilisation.

7A2. **Structure.** 170 (Infra Sp) Engr Gp has six Works Groups, one of which is TA.¹ Each works group has a number of STRE sub-units. Whilst most of its STREs provide general 'works' support, some provide a deeper level of specialist engineering support:

- a. Water development.
- b. Bulk fuels.
- c. Electrical power.
- d. Hospital design.
- e. Materials and site investigation.²
- f. Force protection engineering.

7A3. **Reachback.** It is inefficient to hold a wide range of specialist engineering units and personnel forward throughout an operation unless there is a specific on-going role for them. For this reason, a deployed works group will reachback, or call forward an individual specialist or members from one of its specialised STREs. Its TA personnel in particular bring a depth of engineering specialisation that is not possible from their regular counterparts. This allows design work and other preparation to be rear-based whenever practical to do so, and that the best available advice is used.

7A4. **Works Groups.** Works Groups are highly capable units that manage infrastructure projects through life and can use both military units³ and

¹ Note: 12 (Air Sp) Engr Gp provides direct support to the Air Component and therefore maintains its own, separate works group: Work Group (Airfields).

² Including Environmental Baseline Surveys (EBS) and Environmental Condition Reports (ECR).

³ Taking engineer units under command, if required.

contractors⁴ to deliver support. When deployed they may also be augmented with a: contracted, civilian, engineering support, or design and management team. A Works Group provides:

- a. Infrastructure consultancy, including planning support and specialist recce.
- b. Programme and project management.
- c. Engineering design.
- d. Contract management.
- e. Facilities management.

⁴ Works Groups have the ability to leverage the support of several thousand contractors.

Chapter 8 – Facilities management

Section 1 – Facilities management definitions

801. **Facilities management.** Facilities Management (FM) is the: *‘integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities.’*¹ When functioning well, facilities management is invisible and simply enables the Force to undertake its operational role. The term facilities management includes both planning and undertaking the work.

802. **Hard, soft and total facilities management.** Facilities management has two major components, referred to as Hard and Soft FM.

a. **Hard facilities management.** This term is used to describe the activities associated with infrastructure support, for example, maintaining and repairing structures, water treatment, and power generation. This chapter focuses mainly on Hard FM.

b. **Soft facilities management.** Soft FM describes activities that are considered to be ‘services’, such as, laundry, catering, and cleaning.

c. **Total facilities management.** It is possible to combine both Hard and Soft FM into one contract; known as a Multi-Activity Contract (MAC), it is said to provide ‘Total FM’. Total FM is also referred to a ‘fully serviced FM’. It is rare to find a single company with all the skills required to deliver Total FM for the whole force in theatre.

803. **Operation and Maintenance.** Operation and Maintenance (O&M) is an old term that is still used to describe the basic work of providing Hard FM.

804. **Facilities management on the operational estate.** Once it is considered appropriate to manage a location as a base, its maintenance (Hard FM) should be planned accordingly. There should only be one facilities management organisation. On main bases, some form of contracted support will be sought from the outset. Nevertheless, military O&M teams may be

¹ European Standard EN15221-1

required initially. There are many possible forms of contract that may be used. However, the Infrastructure Support Provider (ISP) contract usually gives best value for money. In tactical bases, where contractors cannot provide routine support, the military must provide facilities management. This is shown in Figure 8.1.

805. **The FM**'. The head of the Authority's facilities management organisation is referred to as '*the FM*'. This must be someone experienced in delivering facilities management on operations. The title '*the FM*' also has contractual significance in facilities management contracts.

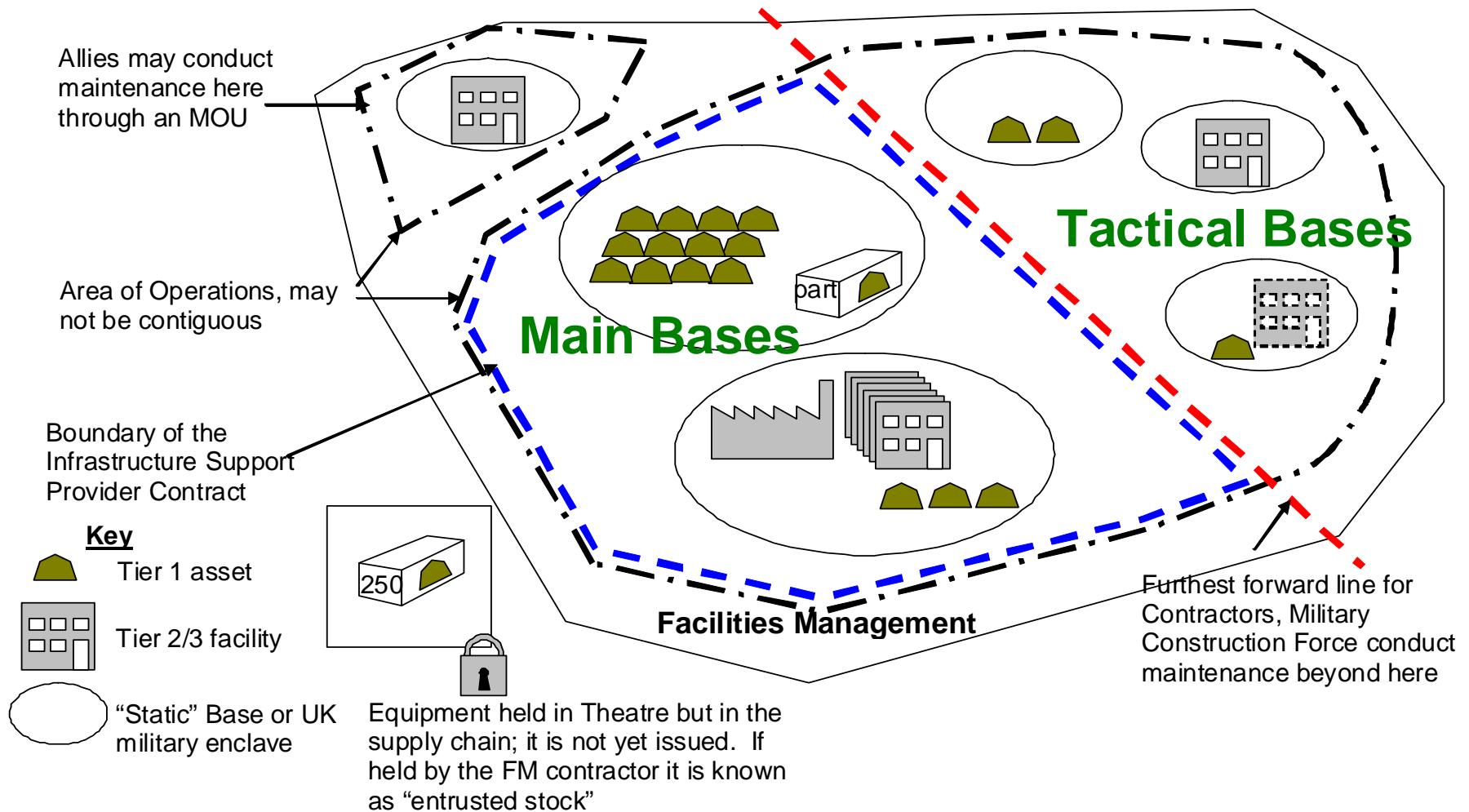


Figure 8.1 – Facilities management on the operational estate

Section 2 – Planning information

806. **Initial site information.** As soon as the requirement for facilities management is identified, planning information should be assembled.

- a. **In-survey record.** The in-survey should have recorded the condition of the site. If one has not been done, the first step should be to conduct one.
- b. **Existing records.** Every effort should be made to obtain any existing drawings, surveys and site plans. These can either be obtained from the landowner or may have been produced by the Works Group.
- c. **Lease conditions.** The conditions of the lease should detail, for what, if anything, the landowner is responsible. The lease should also explain whether the consent of the landowner is required to carry out any work.

807. **Infrastructure Management Policy Statement.** The Infrastructure Management Policy Statement (IMPS) sets out the theatre policy and standards for infrastructure management taking into account operational conditions and the statutory requirements that we aspire to apply. The IMPS supports the site-specific Infrastructure Development Plan (IDP), which is explained in Chapter 2. The Infrastructure Management Policy Statement should set out policy and standards for the following:

- a. Design life and engineering standards.
- b. Safety, Environment, Health and Fire (SHEF) standards.
- c. Processing, reporting and funding of works services (including emergency call-outs, response, and remedial maintenance).
- d. Operation and maintenance.
- e. Inspections.

- f. Repairs, including emergency call-out repairs.
- g. New works.

808. **Asset Register.** The Asset Register is simply a list of all infrastructure assets that are the responsibility of the facilities management.¹ The register should contain sufficient information to fully identify the asset. The Asset Register should be established as soon as possible using asset numbering as described in Defence Infrastructure Organisation (DIO) Specification 024 Issue 5.0. The register is updated each time something is built or equipment is relocated. Held in theatre, it should also be subject to a six monthly review.

Insight 8-1: If it is not on the Asset Register it probably is not *on the radar* for safety inspections.

809. **The Infrastructure Database.** The Infrastructure Database is a development of the Asset Register and maintains the up-to-date records for each asset (for example, asset number, maintenance and inspection details, works carried out, and other information of value to the planning process). Ideally this should be recorded on the MOD's preferred software.² However, any suitable off-the-shelf software would suffice, at least initially. The facilities management is responsible for the maintenance of the Infrastructure Database.

810. **Master Index.** The Master Index (MI) is a library list of the documents that contain the detailed information about the assets held on the Asset Register. The documents listed in the Master Index should be held in *the FM's library*, which should be sub-divided by site. The Master Index *may* include:

- a. Site-specific Infrastructure Development Plan (IDP).
- b. Pre-occupation survey report.

¹ Any constructed, indigenous and equipment (EP and UOR) infrastructure, that forms part of the operational estate.

² Currently Property Manager (PROM)2.

- c. Copy of lease agreement.
- d. All drawings, plans and site maps.
- e. Health and Safety Files and handover documentation.
- f. Operation and maintenance handbooks.
- g. Supporting registers including:
 - (1) Asbestos.
 - (2) Polluting discharges.
 - (3) Confined spaces.
 - (4) Control of Substances Hazardous to Health (COSHH).
- h. Inspection Schedule.
- i. Inspection reports and certificates, including statutory inspection certificates such as fire certificates and test results such as for water quality.
- j. Maintenance Schedule.³
- k. Records of repairs carried out by the Landowner under the terms of the lease.
- l. Names and certificates of appointment for Authorising Engineers (AE) and Authorised Persons (AP).

811. **The Site Data Pack.** The Site Data Pack is a summary of general information related to the site, which includes, plans, the Asset Register and other relevant information. The primary aim of the Site Data Pack is to provide sufficient information to brief roulement personnel on their facilities

³ Maintenance records including Operations and Maintenance log books should be held by the Operations and Maintenance team/contractor.

management responsibilities and to allow potential contractors to tender for operations and maintenance, inspection and repair.

812. **Archiving of records.** When a site is vacated, *the FM* should ensure that a post-occupation survey is carried out and all outstanding issues are addressed with the Landowner. Key documents relating to the site should then be archived in accordance with PJHQ's instructions.

Section 3 – Operation, maintenance, inspection and repair

Planning

813. **Military delivery.** As explained in Chapter 7, military personnel may have to be called upon to deliver facilities management support either early in an operation or in more hazardous areas. Tactical bases are a particular challenge and their design must take FM into account. See Annex 8A.

- a. **The FM Plans delivery.** *The FM* is best placed to understand the risks involved and what is required; so, on the basis of 'underwriting support', *the FM* plans how best to deliver it.
- b. **What must be done and who will do it.** Site-by-site, *the FM* determines exactly what must be done and determines who must do it.
- c. **Check they can do it.** If the occupants of a base are required to undertake some, or all, facilities management functions themselves, *the FM* checks that they are competent to do so. This assessment of competence is the reason why only a suitably experienced person should be *the FM*. This process may identify a requirement for in-theatre training and/or stipulation in the operation's mounting instruction of how many personnel must deploy pre-trained to undertake this work (for example, the number of personnel trained to use in-service generators).
- d. **Mitigation by inspection.** *The FM* may be able to mitigate some of the risks through periodic inspections by specialist personnel.

- e. **Articulate the risk.** *The FM* then advises the commander of the National Support Element (NSE) (JFSp) of the residual risk to operational function, safety of personnel, and equipment serviceability.

814. **Contracted delivery.** Wherever possible, contractors are used to deliver facilities management. Contracted facilities management is almost certainly possible in main bases. By controlling facilities management on both main and tactical bases, *the FM* is well placed to ensure that every opportunity is taken to push contracted support as far forward as possible. There are many possible forms of facilities management contract. The most common are shown in Table 8.1, which shows how facilities management contracts have evolved over time. Current practice is to use an Infrastructure Support Provider contract (see Annex 8B) as it requires the least management by the Authority when deployed. Advice should be sought from the Defence Infrastructure Organisation before selecting the form of contract.

Property Manager (PROM)	Works Repair and Maintenance Manager (WRMM)	Infrastructure Support Provider (ISP)
(a)	(b)	(c)
<p>PROM – Client representative responsible for management of contract.</p> <p>WSM – Works Service Manager. Does the work.</p> <p>EWC – Establishment Works Consultant. Gives professional advice and monitors WSM.</p> <p>No predefined work (except mandatory inspections); instead there is just a list of the items on the estate and a forecast price of work.</p> <p>Very flexible in what can be done.</p> <p>Historically proved to be very conflict driven.</p> <p>Requires high degree of management and monitoring.</p>	<p>An evolution of PROPMAN.</p> <p>Combines EWC and WSM functions.</p> <p>Some opportunity for bundling work into packages.</p> <p>Still rather flexible.</p> <p>Still requires high level of Authority FM management skill.</p> <p>This type of contract permits the adoption of SOPs. These make it easier to use less experienced staff.</p>	<p>Evolved from WRMM.</p> <p>Small Authority team monitors that the ISP contractor is using its systems.</p> <p>All work is split into Delivery Packages (DPs).</p> <p>Contract includes an Inclusive Repair Limit (IRL). This is the cost of repair that the contractor is expected to just get on with, accepting the cost.</p> <p>Requires least amount of supervision – fewest Authority personnel.</p> <p>Requires written procedures to allow audit team to review procedures - not necessarily the actual work done.</p> <p>Not as flexible, requires a stable estate.</p> <p>Has potential to make cost savings as it is optimised for value for money.</p>

Table 8.1 – Evolution of facilities management contracts

Operation and maintenance

815. **Levels of maintenance.** Although the levels of maintenance are based on equipment support principles, they are applicable to all infrastructure:¹

- a. **Level 1.** Servicing and day-to-day preparation.
- b. **Level 2.** Maintenance by replacement, adjustment and minor repair. Level 2 maintenance will normally be carried out by an Operation and Maintenance team on site.
- c. **Level 3.** Maintenance in greater depth requiring specialist skills, tools or equipment. Level 3 maintenance may be done on site by the Operations and Maintenance team, but more usually will require specialist workshop support.
- d. **Level 4.** Full reconditioning, major conversions or major repair. For equipment infrastructure this is unlikely to be undertaken in theatre.

816. **Maintenance schedule.** A site-specific maintenance schedule should be developed from the generic schedule based on Schedule C of DIO Spec 005 Issue 003, *Army Equipment Support Publications (AESPs)* and manufacturers' data. The maintenance schedule is simply a list of those maintenance tasks appropriate to the site. The schedule should detail:

- a. The assets to be maintained by asset serial number with a brief description of the system, structure or installation, as appropriate.
- b. The date, type and level of the next maintenance.
- c. The resources necessary to carry out the maintenance.
- d. Annotation, if repair is the responsibility of the landowner.

¹ Extracted from *Materiel Regulations for the Army Volume 2, Equipment Support*.

817. Stock of operation and maintenance materials and entrusted stock. A facilities management contractor will need to hold a stock of materials to support operation and maintenance, especially high turnover items. This stock will usually be the property of the contractor, unless the items have been demanded through the Authority supply chain for the maintenance of equipment or are Authority supplied spares. Items owned by the Authority are known as ‘entrusted stock’. If it is intended to use any of these stock items for non- facilities management purposes:

- a. **Entrusted stock.** Until committed to a job, entrusted stock is in effect held in the supply chain. PJHQ’s authority should be given if it is intended to use entrusted stock. An Additional Resource Bid (ARB) may be needed for replacement.

Insight 8-2: Seek PJHQ’s authority before using Entrusted Stock for anything other than facilities management.

- b. **Contractor’s stock.** The contractor must be reimbursed the cost of replacement and this cost charged to the project on which the items will be used. Replacement must not be charged to the facilities management contract.

818. Maintenance records. Maintenance should be recorded in the Infrastructure Database and held by *the FM* to inform future work and to facilitate bill payment. Although this work may be undertaken by a contractor on operations, the records and information in them belong to *the FM*.

Inspection

819. The reason for inspections. There are a number of statutory and mandatory inspections essential to the safe running of infrastructure. These are listed in Schedule C of DIO Spec 005 Issue 003. There are also a number of other inspections, the priority of which will be dictated largely by operational circumstances. The latter assist in ensuring the efficient functioning of the operational estate.

820. **Inspection schedule.** A site-specific inspection schedule listing all the identified Facility Management inspection tasks for the site should be compiled. The frequency of inspections should be based both on DIO schedules and on a risk assessment with the following priorities:

- a. **Priority 1.** Inspections that should be carried out as soon as possible after a site is occupied. Priority 1 inspections are limited to those necessary for the immediate protection of the Force.
- b. **Priority 2.** Inspections required by UK law. Priority 2 inspections should be carried out as soon as operational circumstances permit.
- c. **Priority 3.** Additional inspections.

821. **Updating and review.** The inspection schedule should be updated as necessary and a formal review carried out every quarter. The review should confirm the accuracy of the schedule and consider the rationalisation of task scope and frequency, and combination or elimination of tasks. Any proposed changes should be supported by a risk assessment and documented.

822. **Specialist inspections.** There are a number of specialist inspections which either cannot be contracted out to commercial organisations or require specialist capabilities not normally found within a facilities management contractor.

- a. Ammunition/armaments facilities.
- b. Fire safety.
- c. Environmental health.
- d. Communications including Radiation Hazards (RADHAZ).
- e. Security and detention centres.
- f. Masts and towers.

Insight 8-3: Unless a mast has been manufactured and erected by a DIO-approved contractor, it is never likely to be given a 'safe-to-climb' certificate.

823. **Recording inspection information.** A summary of the results of inspections should be recorded in the infrastructure database. Inspection reports and, if applicable, certificates should be stored in *the FM's* library and recorded on the Master Index.

Repair

824. **Repair and minor modification requests.** A formal system should be established for the raising and staffing of requests for repairs and minor modifications. Requests may be generated by the user or may result from an inspection. The procedures should make it clear who is authorised to request work and how that request should be made. If a financial cost is involved, formal financial authorisation must first be given. This requires an estimate of cost to be made beforehand. As explained in Chapter 6, responsibility for raising a Works Order on a contractor and providing Financial Authority for it, must not be vested in the same individual.

825. **Speed of required response.** The speed of required response for any repair should be specified appropriately and realistically for the works and the local site conditions. The guide for the speed of response is as follows:²

- a. **Emergency.** Investigate, make safe and restore when practically achievable, or provide alternative amenities/services immediately at any time of day or night.
- b. **Very urgent.** Investigate and make safe as soon as possible in 'normal working hours'. Restore or provide alternative amenities/services within the time period specified, normally the next working day.

² These descriptions are based on those used in the UK. They may be reasonably applied to a main base, but are unlikely to be of practical use for tactical bases.

- c. **Urgent.** Investigate and make safe as soon as possible in normal working hours. Repair within seven days.
- d. **Routine.** Repair within eight weeks.

826. **Emergency call-out repairs.** Emergency call-out repairs are works that, because of their nature, cannot wait until the next working day for action and may include:

- a. Where there is an imminent danger of death or serious injury.³
- b. When there is a risk to the health and safety of personnel.
- c. Where operational effectiveness will be affected.
- d. Where a delay will incur significant additional damage or hazard.

827. **Minor modifications.** Minor modifications are small improvements to facilities that are unlikely to be of sufficient priority to be carried out through the normal facilities management system. Such works may include self-help, provision of recreational facilities, or the addition of fitted furniture. Minor modifications must be subject to all the same health and safety assessments applicable to other works, and must be allowed under the lease. All minor modification requests are to be staffed using the formal repair and minor modification system, and once complete should be recorded in the infrastructure database.

Insight 8-4: Experience has shown that 'self-help' work often falls far short of acceptable electrical, fire and other safety standards. Whilst there is undoubtedly a place for it on the operational estate, the risks associated with it must be very carefully managed.

³ Against this must of course be balanced the risk to personnel making the repair.

Annex 8A – Facilities management planning for a tactical base

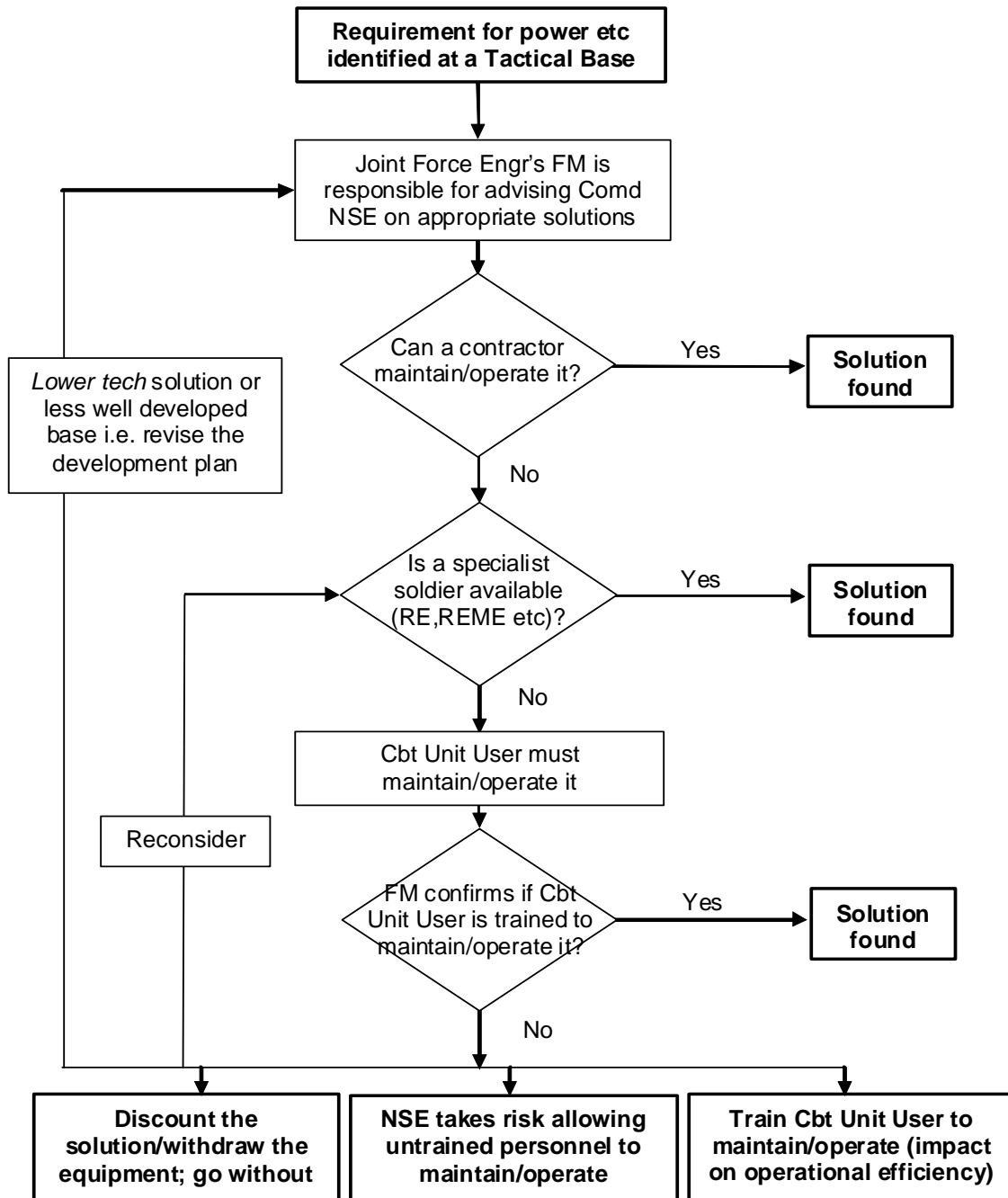


Figure 8A.1 – Facilities management planning for a tactical base

Annex 8B – Infrastructure Support Provider contract

8B1. **Infrastructure Support Provider contract.** An Infrastructure Support Provider (ISP) contract is a framework arrangement intended to provide facilities management. It is a form of contract used both on the home base and on the operational estate. Given the typical size and value of an Infrastructure Support Provider contract, it is usually sponsored by PJHQ and negotiated on their behalf by the Defence Infrastructure Organisation (DIO). Experience has shown that the cost of infrastructure support is roughly the same as the total of all other life-support services. The biggest single value contract on an operation is almost always the infrastructure maintenance contract.

8B2. **Range of functions.** An Infrastructure Support Provider contract allows a range of functional support:

- a. **Hard facilities management.** The primary purpose of an Infrastructure Support Provider contract is the provision of Hard FM support.
- b. **Soft facilities management.** It can also be used to obtain Soft FM services.
- c. **New work.** As explained later, an Infrastructure Support Provider contract can be used to procure new construction work.

8B3. **Administering the contract.** It is usual for the deployed Works Group to provide the Theatre Designated Officer (TDO) for an Infrastructure Support Provider contract. *The FM* is usually a member of the Works Group and operates under a formal delegation. Any under-performance of the Infrastructure Support Provider contractor should be brought to the attention of *the FM* in the first instance. Performance on an Infrastructure Support Provider contract is measured by the production of deliverables against an agreed series of Key Performance Indicators (KPIs).

8B4. **Delivery packages.**¹ The flexibility of an Infrastructure Support Provider contract lies in its structure. It is formed from a series of Delivery

¹ Formerly known as Works Area Packages (WAPs).

Packages (DPs). These are discrete activities and as such form elements of work against which payment is made. Some Delivery Packages may be dormant in an Infrastructure Support Provider; however, a rate for each is pre-negotiated. This removes the need to go to tender if it becomes necessary to activate the dormant Delivery Package. Table 8B.1 gives a typical list of Delivery Packages in an operational Infrastructure Support Provider contract.

Ser	Delivery Package (DP)
(a)	(b)
1	Operation and maintenance of Tier 1 assets TDA, ITC and Fd Hosp.
2	Operation and maintenance of Tier 2 and 3 assets, facilities, plant, equipment and systems.
3	Operation and maintenance of all power generation plants and distribution (not covered under DP 1).
4	Operation and maintenance of all water treatment plants, storage and distribution (not covered under DP 1).
5	Operation and maintenance of All sewage treatment plants, sewerage and containment (not covered under DP 1).
6	Pest control.
7	Ordered works capability for works up to £50k.
8	Contractor's intelligent Helpdesk.
9	Tier 2 stores procurement, management and control.
10	Kitchen and food preparation area deep cleaning.
11	Clinical waste incineration.

Ser	Delivery Package (DP)
(a)	(b)
12	Accounting and management of expeditionary campaign infrastructure.
13	Provision of a New Works capability for works in excess of £50k (includes the design and management of construction).
14	Inspections, planned preventative-maintenance, and response maintenance of other, specifically named, facilities, for example, <i>Reefers</i> , Bulk Fuel Installations, and Mechanical Transport Fuel Installations.
15	Soft-FM of Temporary Deployable Accommodation.
16	Monitoring of inspections, operation and maintenance carried out by others.

Table 8B.1 – Typical Infrastructure Support Provider Works Area Packages

8B5. Inclusive Repair Limit. The Inclusive Repair Limit (IRL) is the maximum cost of individual repairs (inclusive of all labour materials and plant) which the contractor has included within their firm price for the contract. Anything above this cost may only be undertaken by raising a mini-contract proposal on an MOD Form 1097. These are specifically funded on a case-by-case basis using in-theatre financial delegation. They are not allowed for in the original financial approval. It is important to set the Inclusive Repair Limit at the right level and adjust it as experience is gained from working on a particular estate.

The table below shows an example of three options for a priced Delivery Package given by a contractor in the tender, each option has a different Inclusive Repair Limit. An 'occurrence' is defined as a repair **under** the value of the Inclusive Repair Limit.

Ser	Occurrences	Option A IRL £50	Option B IRL £100	Option C IRL £150
(a)	(b)	(c)	(d)	(e)
1	0 – 1000	£400k/yr	£440k/yr	£480k/yr
2	1001 – 1500	£410k/yr	£470k/yr	£540k/yr
3	1501 – 2000	£420k/yr	£500k/yr	£600k/yr

Table 8B.2 – Example of how Inclusive Repair Limit and occurrence level affect Delivery Package fees

If the IRL is set too low, *the FM* will write many MOD Form 1097s and may become overloaded in paperwork, thereby requiring more staff. However, this keeps the contract cost lower, for example, the contractor will be paid £400k/yr under Option A compared to £480k/yr under Option C. If there is an increase in occurrences for a particular month, the contractor is entitled to be paid at the higher rate. For example, under Option B, if there were 1100 occurrences in a particular month, the contractor would be paid £470k/12 for that month.

8B6. Life cycle repair under the Inclusive Repair Limit. If the Inclusive Repair Limit is set too high, the risk is transferred to the contractor and a much higher fee is charged. This also makes for poorer quality maintenance. For example, if under Option C the replacement of a faulty pump motor costs £149, the Contractor is tempted to make repeated ‘patch’ repairs instead at say £10 each. Therefore the pump keeps failing and the number of occurrences rises. Perversely, this increases the Contractor’s overall fee, yet the estate is kept in a sub-optimal state of repair.

8B7. Forward Maintenance Register. The Forward Maintenance Register (FMR) is a pre-planned list of the repair work that is established at the start of a year but looks out over a number of years. It is the Infrastructure Support Provider’s maintenance schedule. It should list all outstanding maintenance items and identify new works irrespective of their value. The work should be

categorised and programmed into the appropriate years for implementation, dovetailing into the site-specific Infrastructure Development Plans. The contractor maintains the FMR and regularly updates it as required. *The FM* is responsible for reviewing and formally approving any changes to the FMR on a quarterly basis and assessing its validity, and ensuring that it reflects the maintenance/new works requirements on an annual basis.

8B8. Draft Pre-Planned Maintenance Programme. The Draft Pre-Planned Maintenance Programme (DPMP) is derived from the first year of the Forward Maintenance Register and is developed by the contractor to include a procurement strategy. The DPMP is passed to *the FM* to pursue funding and approval. Once agreed, a copy of the DPMP is produced by the contractor and submitted via *the FM* to the theatre Infrastructure Staff for approval. On confirmation of funding, the DPMP should be reviewed and amended by the contractor and re-submitted to *the FM* as the Pre-planned Maintenance Programme (PMP).

8B9. Pre-planned Maintenance Programme. The Pre-planned Maintenance Programme (PMP) is the agreed and funded works programme for the current financial year. Both the physical and financial progress being made in-year is routinely discussed at monthly progress meetings.

8B10. Entrusted Stock. Items of Entrusted Stock are spares or material owned by the Authority which the contractor is paid to maintain in-theatre on our behalf. An Infrastructure Support Provider contractor will take over an opening balance and be expected to maintain an approved level of stock holdings. Normally, however, the Infrastructure Support Provider contractor should determine its own stock inventory and levels. This is not entrusted stock as the contractor owns these items until the Authority pays for them when they are incorporated into a job, through an 'occurrence' or a 'MOD Form 1097'. The only items of entrusted stock the Infrastructure Support Provider contractor should hold are those the Equipment Manager requires the contractor to use when maintaining equipment infrastructure. When an item within a piece of equipment requires replacement, *the FM* should contact the Equipment Manager and determine whether a specific item of Government Furnished Equipment (GFE) should be used (from the entrusted stock). Sometimes a locally procured alternative may be acceptable.

8B11. Paying for work. At the outset of an Infrastructure Support Provider contract, PJHQ J4 Infra obtains financial approval to initiate the new contract. This sum is based on the tendered and agreed rate in the Delivery Packages and an estimate of the likely number of occurrences. The contract sum also includes management fees and any pre-agreed charges. It does not include any sum for work undertaken through MOD Form 1097s. Any work undertaken outside a Delivery Package (through a MOD Form 1097) must have separate financial approval beforehand. Each month *the FM* is given a monthly bill by the contractor (on an AG173) for work undertaken under a Delivery Package and for work undertaken through an MOD Form 1097 (on an AG177). *The FM* checks that the number of occurrences, and hence the billing rate, are correct, determines any contra-charges, and certifies that the work has been done. The Works Group CO, or his representative in theatre, signs the AG173/AG177 as the certifying officer. The contractor takes these certificates directly to the Defence Billing Agency for payment and a copy goes to the theatre CivSec for record purposes. Theatre's CivSec consolidates the expenditure on the AG173/AG177 and notifies PJHQ J8. Unless this is done, PJHQ J8 will have no record of how much money is spent through the Infrastructure Support Provider contract. The Infrastructure Staff should ensure that the J8 staff are aware of this process.

Insight 8B-1: PJHQ needs to know how much is spent on the Infrastructure Support Provider contract. In order to do this, theatre must inform PJHQ how much of its financial delegation it exercises on the contract.

8B12. Ordered Works and New Works. Using an MOD Form 1097, the Infrastructure Support Provider allows *the FM* to procure 'Ordered Works' (usually up to the value of around £50k). Work above that value is known as 'New Works'. On case-by-case advice from DIO, New Works *may* also be obtained through the Infrastructure Support Provider contractor using an MOD Form 1097. However, above a certain limit (usually £250k), any proposal must be considered to be a new 'Project' and subject to normal tender competition.

Chapter 9 – Host nation, NATO and coalition arrangements

Section 1 – Host nation and collective arrangements

901. **Life support is a national responsibility.** In a multinational operation, each nation bears ultimate responsibility for ensuring the provision of support for its own forces. Nations must ensure, individually, or by collective arrangements, the provision of adequate resources to support their forces.¹

902. **The UK's responsibility is the operational estate.** As defined in Chapter 1, the operational estate is that operational infrastructure for which the UK is responsible. A facility may be needed to support the operation but it might be another nation's operational estate that UK forces are merely permitted to use.

903. **Host Nation Support.** Host Nation Support (HNS) is the term used to describe civil and military governmental assistance given by a Host Nation (HN) to the personnel or forces of another allied or friendly nation or organization which are located on, operating in, or transiting through the, host nation's territory. Host Nation Support Arrangements (HNSAs) are developed with reference to existing Status of Forces Agreements (SOFAs) or other relevant agreements. They can either be bilateral between the UK and host nation or be agreed collectively such as through NATO. The detailed arrangement of each operation is therefore likely to be unique and complex. The nation providing support to another is often referred to as the host nation in any formal agreement, especially in NATO documents. This can cause confusion when it is not the nation in whose country the operation takes place.

904. **Coordination.** Coordination of Host Nation Support planning and execution between coalition forces and the national authorities is essential in order to ensure operational effectiveness, efficiency and to avoid competition for resources. In theatre, the division of responsibility is often drawn up on a geographic basis, where areas of real estate are allocated either to each Sending Nation (SN) or managed in common (for example, by NATO).

¹ AJP-4.5(A), *Host Nation Support Doctrine and Procedures*.

905. **Collective arrangements.** Coalition countries can make economies of scale by making collective arrangements for logistic support. These arrangements can be jointly shared; however, it is often more effective to agree that one nation will act as the lead and others may reimburse the costs incurred. The form and nature of collective arrangements will therefore depend the capability and capacity of each sending nation.

906. **Formal agreements.** Given the costs involved and differences in language, formal, written agreements should always be used.

a. **Memorandum of Understanding.** The Memorandum of Understanding (MOU) is the foundation document in the Host Nation Support planning process. The MOU² represents the formal establishment of the overarching principles for provision of Host Nation Support between the sending nations and the host nation and establishes the basis for follow-on Host Nation Support documents. An MOU is an *umbrella* document providing a framework for subordinate documents. MOUs are usually bilateral and generally cover high-level view of requirements such as jurisdiction, status of forces, discipline, finance, liability, claims, and accidents. The signing of an MOU implies an intent or willingness of one nation to support another nation's forces. A single MOU may suffice for small-scale operations or exercises, supported by detailed annexes.

b. **Technical Arrangement.** A Technical Arrangement (TA) and its associated annexes gives the details of logistic arrangement between signatories. Specialist advice from Defence Infrastructure Organisation (DIO) and the Military Design Authority should always be sought before drawing up a Technical Arrangement incorporating infrastructure support. A Technical Arrangement is subordinate to an MOU and its specific purpose depends on the scale of the support required. In larger scale operations it covers broad procedural aspects of support. In smaller scale operations it is an Implementing document focusing on detailed support issues. Technical Arrangements can be bilateral or multilateral documents.

² NATO considers these MOU to be politically binding whereas some countries consider them legally binding. The UK does not consider them to be legally binding.

c. **Implementing Arrangement.** An Implementing Arrangement (IA) is a subordinate document to either an MOU or Technical Arrangement and is used to effect the support requirements for a specific operation. A Technical Arrangement incorporates the detailed information from the Statement of Requirement (SOR).

907. **Mutual Logistic Support.** Mutual Logistic Support (MLS) is the reciprocal assistance between two or more nations in the transfer, exchange, loan or lease of logistic support, supplies and services in a third country. The UK has a number of standing Mutual Logistics Support Arrangements (MLSA) with key allies. These consist of an MOU giving an overarching commitment and a Technical Arrangement explaining how the Mutual Logistic Support MLS will be sought and paid for. Individual Implementing Arrangements are then written for each specific activation e.g. US/UK MLSA is the 'Acquisition and Cross-Servicing Arrangement' (ACSA).

908. **Making use of formal support arrangements.** The infrastructure staff must ensure that the Technical Arrangement, or any other agreement, makes clear a number of critical aspects.

a. **Ownership.** Ownership of the infrastructure should be unambiguous.

Insight 9-1: When sharing support arrangements with a coalition partner, the formal agreement should stipulate who actually owns the infrastructure. If it is held 'in common', arrangements should be made for if one party decides to withdraw from the operation.

b. **Cost reimbursement.** Cost reimbursement must be agreed. When several parties are involved, the accepted principle is that each party can obligate only itself, and no other. Moreover, host nations should apply costs fairly to all recipients for the services provided.

c. **Quality and standard of provision.** The acceptable health and safety standards should be stated. Who is responsible for safety? What should be done if, say, UK standards of fire escape are higher than those of the host nation or partner delivering the infrastructure?

What level of physical protection should be built into the facilities and who should check that it is acceptable? The Military Design Authority will be particularly useful in articulating the required quality and standard of provision.

d. **What to do about under-performance.** How should under-performance be reported and remedied?

Insight 9-2: If an existing Memorandum of Understanding (MOU)/Technical Agreement (TA) is *failing and* does not deliver the infrastructure support that is sought, it is better to pursue remedies through that MOU/TA rather than seek to create a parallel UK estate. This only adds to confusion over responsibilities in the host nation's bases and reduces value for money.

909. **UK as a provider.** The UK is often asked to provide support to smaller national contingents. Our ability to do so is often used at the political level to leverage support from other nations who may have the will, but lack the capacity to provide military support to an operation.

a. **Ownership.** The UK position is usually that the UK 'owns' the infrastructure and that support is provided as a *service*. At the end of an operation, the fact that a partner has paid to live in one of our tented camps does not entitle them to take it home with them or gift it to someone else.

b. **Cost Reimbursement.** The way that the MOD breaks down its support costs makes it particularly difficult to identify the full cost of provision of infrastructure support. If, for example, an extra 600-man camp needs to be sailed into theatre to provide support to another nation, the discrete shipping cost *for that camp*, is often hard to establish. The only readily identifiable costs are for such things as business cases against Net Additional Costs of Military Operations (NACMO) and the cost of fuel, and food, for example, consumed. It is for CivSec/J8 to determine the cost charged for our support.

c. **Binding cost estimates.** Understandably, nations wish to know beforehand how much our support will cost them. If we make an

estimate of that cost, it must be made clear to them that this cannot be considered *contractually binding* on the UK. The cost for which we seek reimbursement is the actual cost incurred, not our estimate of it.

Section 2 – NATO and NATO maintenance and supply agency

910. **NATO as host nation.** On a NATO operation, NATO itself may act as host nation to the sending nations. Infrastructure and other support may be provided *in common*, for all, funded centrally.

911. **NATO Maintenance and Supply Agency.** The NATO Maintenance and Supply Agency (NAMSA) is NATO's principal logistics support management agency. Its main task is to assist NATO nations by organising common procurement and supply of spare parts and arranging maintenance and repair services necessary for the support of various weapon, and other systems. However, it also provides logistic support for NATO Crisis Response Operations.

a. **Commissioning NATO Maintenance and Supply Agency.**

NAMSA may be commissioned through NATO for a common project, such as a NATO headquarters facility. Alternatively, a nation may request services directly from NAMSA by establishing a specific Sales Agreement or Service Level Agreement with NAMSA. On receipt of a Statement of Requirement, NAMSA will conduct a formal feasibility study for approval by the lead nation. NAMSA will then prepare a full project proposal listing options considered, detailing recommended solutions and providing an implementation schedule and detailed cost estimates, including NAMSA's fee as Executing Agent to manage the delivery.

b. **Contractor engagement by NATO Maintenance and Supply Agency.**

NAMSA engages contractors through international competitive bidding. NAMSA's charter requires this bidding be open to companies from all NATO countries; in much the same way as we are obliged to make our contracts open to all EU companies. NAMSA maintains a Source File of contractors whom it has pre-approved. Regional and local contractors may be added to this list if they meet NAMSA's pre-qualification requirements. NAMSA calls its Invitation to

Tender (ITT) a Request for Proposal (RFP). It is obliged to take the returned tender/proposal that offers the best value for money.

912. **NATO funding for infrastructure.** NATO's infrastructure expenditure is managed through the NATO Security Investment Program (NSIP). NSIP is a process by which funds are obtained, rather than a budget, as such. NSIP allows the alliance to underwrite the cost of support facilities,³ transportation, and storage facilities. NSIP is intended to support the operational facility requirements of NATO-assigned forces deployed outside of their national borders.

913. **Pre-financing.** Alliance nations may declare to NATO their intention, nationally, to fund a project that may later qualify for NATO Security Investment Program funding. To be reimbursed under NSIP, the country *must* submit a pre-financing statement to the NATO Infrastructure Committee *before* work starts. Setting up pre-financing arrangements and obtaining reimbursement is a CivSec/J8 function. However, infrastructure staff may need to make them aware of this option.

³ Including command, control, communications, and intelligence facilities.

Chapter 10 – Applying safety rules to the operational estate

Section 1 – Policy and regulation

1001. **MOD Policy.** The MOD's Safety Policy is set out in JSP 815 *Defence Environment and Safety Management* and in JSP 454 *Land Systems Safety and Environmental Protection*. The key points are given in the Secretary of State (SofS) for Defence's policy statement on Health, Safety, Environmental Protection and Sustainable Development.¹ With regard to the operational estate, the key provisions set out by the SofS are:

- *'Overseas we apply UK standards where reasonably practicable and, in addition, comply with relevant host nation's standards.*
- *Where there are exemptions or derogations from either domestic or international law applicable to Defence, we introduce standards and management arrangements that produce outcomes that are, so far as reasonably practicable, at least as good as those required by legislation.*
- *Where there is no relevant legislation, our internal standards aim to optimise the balance between risks and benefits. This does not mean avoiding risks but managing them responsibly on the basis of impact and likelihood.*
- *We seek to disapply legislation on the grounds of national security as far as possible only when such action is essential to maintain operational capability.'*

1002. **Role of Permanent Joint Headquarters.** As explained in Chapter 2, Chief of Joint Operations (CJO) is responsible for the operational estate, including the application of safety policy within it. Within Permanent Joint Headquarters (PJHQ), CJO's principal advisor on safety issues is the Chief Environment and Safety Officer (CESO). CESO (CJO) is therefore the main point of contact regarding safety policy issues on the operational estate.

¹ Policy Statement by the Secretary of Defence, Part 1 – *Guiding Principles* (20 September 2010, but updated regularly).

1003. **Role of Defence Infrastructure Organisation.** Joint Services Publication (JSP) 375 *MOD Health and Safety Handbook* sets out the organisation and arrangements for the day-to-day management of health and safety within the MOD and is divided into four volumes. Volume 3 gives detailed rules and procedures of the MOD's Safe Systems of Work (SSoW) for the management and control of significant risk activities on the defence estate and so is of particular relevance to the operational estate. Even though the JSP excludes itself from application to military works areas, its provisions remain pertinent to the management of safety on the operational estate. Defence Infrastructure Organisation (DIO) produces and maintains JSP 375 Volume 3. DIO is therefore an important source of advice for the application of safety rules and procedures.

1004. **Reasonably Practicable.** The term 'reasonably practicable' is used throughout safety policy and legislation.² The concept of 'reasonably practicable' is used to weigh a risk against the trouble, time and money needed to control it. The definition is set out by the Court of Appeal:³

'Reasonably practicable' is a narrower term than 'physically possible' ... a computation must be made by the owner in which the quantum of risk is placed on one scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time or trouble) is placed in the other, and that, if it be shown that there is a gross disproportion between them – the risk being insignificant in relation to the sacrifice – the defendants discharge the onus on them.'

The decision is weighted in favour of health and safety because the presumption is that the duty-holder should implement the risk reduction measure. To avoid having to make this sacrifice, the duty-holder must be able to show that it would be grossly disproportionate to the benefits of risk reduction that would be achieved.

² For example, the term As Low As Reasonably Practicable (ALARP) is often used.

³ *Edwards v. National Coal Board* [1949] 1 All ER 743.

Insight 10-1: Determining *reasonably practicable* is not about establishing an even balance between the costs and benefits of measures. It is about adopting measures except where they are ruled out because they involve grossly disproportionate sacrifices.

1005. **Competence.** Policy and legislation also make extensive reference to ‘competent persons’. The Management of Health and Safety at Work Regulations 1999 (MHSW) require employers to ensure that they use people who have ‘*sufficient training and experience or knowledge and other qualities*’ to enable them to undertake the required work. There is no detailed guidance on what exactly constitutes ‘competence’. Within the MOD, the term ‘Suitably Qualified and Experienced Personnel’ (SQEP) is used to describe those people who have the right competence to undertake a specific task.

a. **Competence is no guarantee.** The possession of competence will not in itself guarantee safety. It can never ensure that any particular task is performed properly, since that depends on the correct application of that competence in the particular circumstances. However, it will reduce risk and improve the predictability of good performance.

b. **Competence is context-dependent.** Competence might be transferable from one work situation to another, but the extent to which this is possible depends very much on the *context* in which apparently similar competence is required.

c. **Evidence of Competence.** In the context of safety on the operational estate, there are two key elements that provide evidence of competence:

(1) **Assessment by a 3rd party.** Technician and professional qualifications or training followed by assessment, provide good evidence of competence.

(2) **System knowledge.** Knowledge of a similar system at a different location may compensate for lack of familiarity with the actual site.

d. **Decisions on levels of competence.** Under the terms of the MHSW Regulations, it is for the employer to ensure that their employee is competent to undertake a specific task. Risk remains with the chain-of-command. Therefore it is for the chain-of-command to decide⁴ who is considered a *competent person* in any particular circumstance on the operational estate.

Insight 10-2: Competence involves much more than technical training. It includes attitude, behaviour, and judgement, as well as current experience and knowledge of the application domain.

1006. **Competent Army Authority and Inspectorate.** The Competent Army Authority and Inspectorate (CAA&I) system was set up to ensure that self-governance and reputation are upheld both in the UK and on operations. The CAA&I is primarily concerned with policy, standards, training and equipment. HQ EinC(A) acts CAA&I for all engineer activity⁵ in the Land environment. The relationship between engineering and infrastructure is explained in Chapter 1. The specific CAA&I areas pertinent to the operational estate are:

- a. Works (construction and Facilities Management (FM)).
- b. Force Protection engineering.
- c. Field electrical power.
- d. Bulk water provision.
- e. Bulk fuel facilities.

⁴ Upon advice received.

⁵ Note, the remit covers 'engineer activity', not 'the activity of Royal Engineer units'.

Section 2 – Risk on the operational estate

1007. **Personnel at risk.** By definition, the UK is responsible for the development and sustainment of the operational estate. The safety measures applied to the operational estate are intended to protect all personnel, regardless of nationality and status, who are on that estate.

1008. **UK Personnel not on the operational estate.** UK personnel may use, or be based, in infrastructure outside the operational estate.⁶ The provision and maintenance of that infrastructure is likely to be arranged through a Memorandum of Understanding (MOU) with another national partner as part of Collective Responsibility (CR) arrangements. The chain-of-command retains a duty-of-care⁷ towards its personnel regardless of their location. Unless their camp is within a UK base, we do not tell a coalition ally *how* to apply UK safety policy and legislation to the operational infrastructure that they operate; we do not insist on the application of JSP 375's *ways of working* to their operational estate. Instead, through the Statement of Requirement (SOR) in the Technical Agreement (TA)/Implementing Arrangement (IA) we can, and should, stipulate the safety *standards* we wish to see applied. For example, electrical safety issues in an ally's shower block used by UK personnel, are resolved as an HNS issue, not as an Infrastructure issue *per se*.

1009. **Risks associated with different types of infrastructure.** There are different hazards associated with the different types of infrastructure within the operational estate.

a. **Indigenous infrastructure.** This is very often constructed and maintained to a standard that is below that which would be considered acceptable in the UK. Nevertheless, the need for its adoption by a deployed force may be so urgent as to preclude doing much to mitigate that risk.

b. **Equipment infrastructure.** Most, although not all, items of issued equipment infrastructure have a formal Safety Case that addresses the risks associated with it, almost invariably assuming

⁶ This does not refer to *camping-with-equipment*, see Chapter 1.

⁷ The National Support Element (NSE) is charged with coordinating alongside other nations with regard to the provision of infrastructure which is safe and to a standard compatible with those standards appropriate for UK occupation.

that the equipment will be in mobile use (see Chapter 1). An equipment Safety Case also typically assumes that the person/unit assembling, operating and decommissioning the equipment will not change. When it is static⁸ for prolonged periods, the assumptions on which the Safety Case is based, may no longer be valid. Therefore the provisions of the Safety Case may need to be augmented by an SSoW. Similarly, when modifications are made to an item of equipment, or it is used outside its intended purpose,⁹ these actions will invalidate the Safety Case. This does not mean that the equipment cannot now be used. It does mean, however, that, following a risk assessment, the equipment *must* be operated inside an SSoW in order to ensure that the safety risks are adequately mitigated.

c. **Constructed infrastructure.** Infrastructure commissioned by the UK and constructed in theatre is usually designed with the intent of complying with UK standards, and is in a location where an SSoW can more readily be applied.

d. **Allied infrastructure.** Even the infrastructure that is provided by our allies and coalition partners (military and civilian) may not comply with UK health and safety standards. This does not necessarily mean that it is unsafe. However, it is important to ensure that any coalition or Host Nation (HN) infrastructure is assessed as to its level of safety and suitability, where possible, prior to occupation.

1010. **The operational environment.** UK health and safety legislation is not drafted to take into account the challenges of applying those rules in an operational environment. Through his Operational Safety Statement, CJO seeks to ensure that, where applicable and where the situation allows it, the process of risk assessment is undertaken in order to mitigate the level of risk. There are a number of factors that cause difficulties when seeking to do so:

a. **Operational threat.** The threats from an adversary can be very much greater than those that an SSoW may seek to address. Priority of effort may therefore have to be given to managing operational

⁸ Typically this may be taken as over 6 months, or a unit rotation.

⁹ For example, when fuel equipment is used to pump a category of fuel for which it was not specifically intended.

risks instead. Often it is extremely hazardous to move around in theatre. Therefore, for example, one must balance the risks to personnel travelling to a base to conduct an inspection against the risks associated with not carrying out that inspection.

b. **Time.** Operational circumstances change rapidly: threat goes up and down. Measures that may have been acceptable one day, may not be acceptable the next. Usually it is not immediately apparent that the balance of risk has changed.

c. **Lack of continuity of personnel.** MOD personnel spend only a few months on an operational tour of duty. Even contractors have few personnel who spend a long time deployed. This makes it particularly difficult for personnel to develop the same level of familiarity with the operational estate as they can with the UK estate. Furthermore, assessments of acceptable risk are subjective. As personnel change, so might what is considered to be acceptable.

d. **Lack of familiarity with all applicable safety rules and policy.** There is a huge and ever-growing body of safety policy and procedures with which personnel are expected to comply. Whilst the general principles and many of specific provisions should be known and understood by all, it is not reasonably practicable for *all* personnel to be aware of *all* provisions applicable to them from the outset. Research takes time and must be set in the context of a busy, pressured working environment.

1011. **Main risks.** Based on experience and lessons from operations, the main risks to safety associated the provision of infrastructure support on the operational estate are, in no particular order, listed below:

- a. Fire (particularly from inadequate/unfamiliar escape route).
- b. Electrical power (electrocution and fire resulting from misuse).
- c. Excavations (collapse).
- d. Demolition and structural alteration (collapse).

- e. Confined spaces (asphyxiation).
- f. Moving heavy objects (crane toppling and dropped loads).
- g. Working at height (falls and falling material).
- h. Flight line obstruction (aircraft impact).
- i. Vehicle and plant movement (run over/crush).
- j. Erection of structures (collapse).
- k. Fuel handling (explosion and fire).
- l. Work over water (drowning).

Section 3 – How to apply safety rules

1012. **Principles of application.** When determining how to apply regulation and MOD policy on the operational estate, the following principles must be followed:

- a. The operational chain-of-command is responsible for risk management and determining what is acceptable.
- b. Commanders should seek advice from an appropriate, competent person when determining how risks should be managed.
- c. It is accepted that risks will be taken; they are unavoidable on operations. However, those risks must be identified and properly assessed. Blind risks must not be taken.
- d. UK regulatory and policy standards are applied where reasonably practicable and, subject to the provisions of any MOU/Status of Forces Agreement (SOFA), we comply with any relevant host nations' standards.

- e. Any deviation from regulation and policy can only be made when it is essential to do so in order to maintain operational capability.
- f. Where regulation and/or policy is not applied, we should document the reasons why and state what alternatives have been applied instead in order to mitigate the risk.
- g. Where any derogation is applied, it should as far as reasonably practicable, be based on the intent behind the regulation and/or policy.
- h. All derogations must be put to the chain-of-command for acceptance and subject to periodic review.¹⁰
- i. All reasonably practicable measures must be applied.

Insight 10-3: If derogations from policy/regulations are planned, they should be tested against the principles set out in this Joint Tactics, Techniques and Procedures (JTTP).

1013. **Ownership of risk.** The chain-of-command may need to clarify which risks it has the authority to take. It is good practice to inform a next senior authority of which risks you feel you are taking and where rules and/or regulations are being derogated from.

1014. **Where it is hard to determine what is reasonably practicable.** When in the extreme environment of combat or whilst under fire, it is relatively easy to make a strong case to derogate from some safety regulations, for example, wearing fluorescent clothing when working near plant.¹¹ However, combat does not take place all the time across the entire operational estate. Nevertheless, operational threat may exist and, more pertinently, the support needs of the operation place a heavy demand on the scarce resources available. Whilst some time and resources may be available to reduce risk, this usually comes at the cost of direct support to the

¹⁰ This should be undertaken through CESO (CJO) (or the SO2 Operational Safety, if deployed). The CESO will advise on whom the responsibility rests for accepting the derogation.

¹¹ Note also that some safety policy/regulations may still make sense in combat, such as wearing life preservers when in a boat.

operation. This indirectly increases overall risk. What then is reasonably practicable?

1015. **Determining what is reasonably practicable.** Local circumstances will be the predominating factors in determining what is reasonably practicable. Commanders, acting on competent advice, should take into account a number of factors:

- a. The feasibility of reallocating personnel and other resources away from operational support to implement safety policy/regulation.
- b. The aggregate demand on finite resources to maintain operational capability. However, the commander must be prepared to explain why the resources were limited and what had been done to make adequate provision.
- c. The need to respond quickly to *preserve operational capability*. This may impact on:
 - (1) The feasibility of researching all the applicable legislation and policy.
 - (2) The feasibility of assessing the benefits of all possible remedial measures beyond those that can be determined after reasonable effort.
 - (3) The feasibility of waiting for the correct resources to become available in before undertaking work.

1016. **Subjective, time, and circumstance-specific decisions.** It is important to recognise that the determination of what is reasonably practicable is both subjective and dependent on the time and circumstances in which the decision was made.

- a. **Subjective.** For any given set of circumstances, it is highly likely that no two people will have exactly the same view on what constitutes 'reasonably practicable'. If commanders disagree, it does not necessarily follow that one must be wrong.

Insight 10-4: Commanders will invariably inherit an operational estate which has been developed on the basis of subjective, risk-taking decisions made by their predecessors. They will have little choice (at least initially) but to accept this. They should seek to change anything with which they feel uncomfortable, or *record* why they did not. What matters is *their* assessment of what is reasonably practicable.

- b. **Time.** Insufficient time may have been available, at the moment a decision was taken, to carry out the risk reduction work required. The passage of time since then is likely to undermine, or erode, a key factor on which the decision was based.

Insight 10-5: Even if safety and operational risk remain the same, the passage of time may mean that what was once reasonably practicable may no longer be so. This may occur in cases for which there may have been no cause to revisit the original problem. It is important therefore to know where safety derogations have been made and to keep the associated risks under review. In particular, follow-on commanders must be made aware of the possible need to review decisions made by their predecessors.

- c. **Circumstances.** The operational environment is a very fluid place. Circumstances can change significantly over very short periods of time. Access to a base may be too dangerous for non-essential inspections, or materials may be unavailable due to supply chain problems. The circumstances in which the risk-taking decision was made can quickly change.

1017. **Record decisions.** When derogating from policy or legislation a record should be made of why it was necessary to do so and what reasonably practicable measures were taken to mitigate the risk. Any format is acceptable. It is good practice to keep the record as part of the Theatre Standard Operating Procedures (SOPs) (see below). Although it is not wrong to fail to make a record, a commander should be able to say why it was reasonable not to have done so. Keeping a record helps to:

- a. **Assist in the assessment.** Recording the factors considered and the conclusion drawn helps clarify thinking.
- b. **Assist subsequent reviews.** Even if there has been no accident or incident, the decision may be subject to subsequent review. A record of factors will greatly help as reviews may take place a long time after the original decision was made.
- c. **Flag for follow-up.** The record also serves to draw attention to successors for the need to review.

1018. **Risk register.** A risk register is a formal record of known risks. Usually a register exists both in PJHQ and in theatre. A risk register focuses on actual risks (such as, fire, or explosion). This is not the same as the document described in the previous paragraph that explains *why* a derogation was applied.

1019. **Theatre Standard Operating Procedures.** SOPs must be established in theatre to describe the way in which infrastructure support safety is managed on the operational estate¹² in that specific military works area; the default being that it is done exactly as prescribed in existing policy or legislation.¹³ These SOPs must be developed to the Theatre Commander's satisfaction and that of PJHQ.

Section 4 – The inter-connection of safety documents

1020. **Paperwork mountains.** Fear of censure and uncertainty over what risks are faced, often leads less experienced personnel to produce large volumes of paperwork listing every safety hazard they can think of. This just wastes time and can obscure the more significant risks under a mountain of paperwork.

1021. **Risk assessment.** Risk assessment is at the heart of any plan to address safety. There are many techniques; standard MOD practice is set out in JSP 375.

¹² Including any Safe System of Work and inspections to mitigate risk.

¹³ Therefore they should avoid merely repeating existing policy and regulation unless necessary in order to set the context.

a. **Cause of injury.** Failure to carry out a proper risk assessment can never be the direct cause of an injury. However, it may be an indirect cause if some preventative action could reasonably have been taken had a *suitable and sufficient* assessment been carried out.

b. **Reasonable effort in making a risk assessment.** How far does the assessor need to go? The MHSW requires that the level of detail in a risk assessment should be proportionate to the risk. Simple assessments will suffice if there are few variables; templated risk assessments are more effective for static conditions or activities that are repeated in a fairly routine way. Unfortunately, the risks faced every day on the operational estate are often dynamic, complex, multi-faceted and sometimes unique. Individuals may have little or no experience of the risks they face – for them the risks *seem* unique. Risk assessments must therefore be seen as an opportunity for an intelligent and well-informed appraisal of risk.¹⁴ Concentration on key risks must not be lost by spreading attention across every conceivable risk. The list in Section 2 should be a useful guide for focusing attention on the main risks. Communication is difficult and the time for explanation is short. It is important to keep it as simple as possible, and no simpler.¹⁵

Insight 10-6: It is reasonably practicable to invest the limited overall time available in focusing on key risks sufficiently, whilst not ignoring all risks completely.

c. **Risk assessments by contractors.** When the risk relates to an employee, the employer cannot delegate *responsibility* for risk assessment. However, the tasking of *making the assessment* can be delegated to a contractor as long as the employer took steps to satisfy himself that the contractor was competent and that the assessment was thorough. Therefore when contractors are used to maintain the operational estate, if the activity impacts on the personnel within the Force, any risk assessment the contractor

¹⁴ Smith LJ, *Uren v Corporate Leisure (UK) Ltd and MOD*, 2 February 2011.

¹⁵ Attr. Albert Einstein.

makes must be reviewed. This is another reason why it is important to be an intelligent customer when deployed.

1022. **Safety documentation.** In addition to risk assessments and registers, there are a wide range of safety documentation systems. Their inter-connection is complex. In order to understand how best to address a particular risk, it is important to understand how these various safety document systems relate to one another; see Figure 10.1.

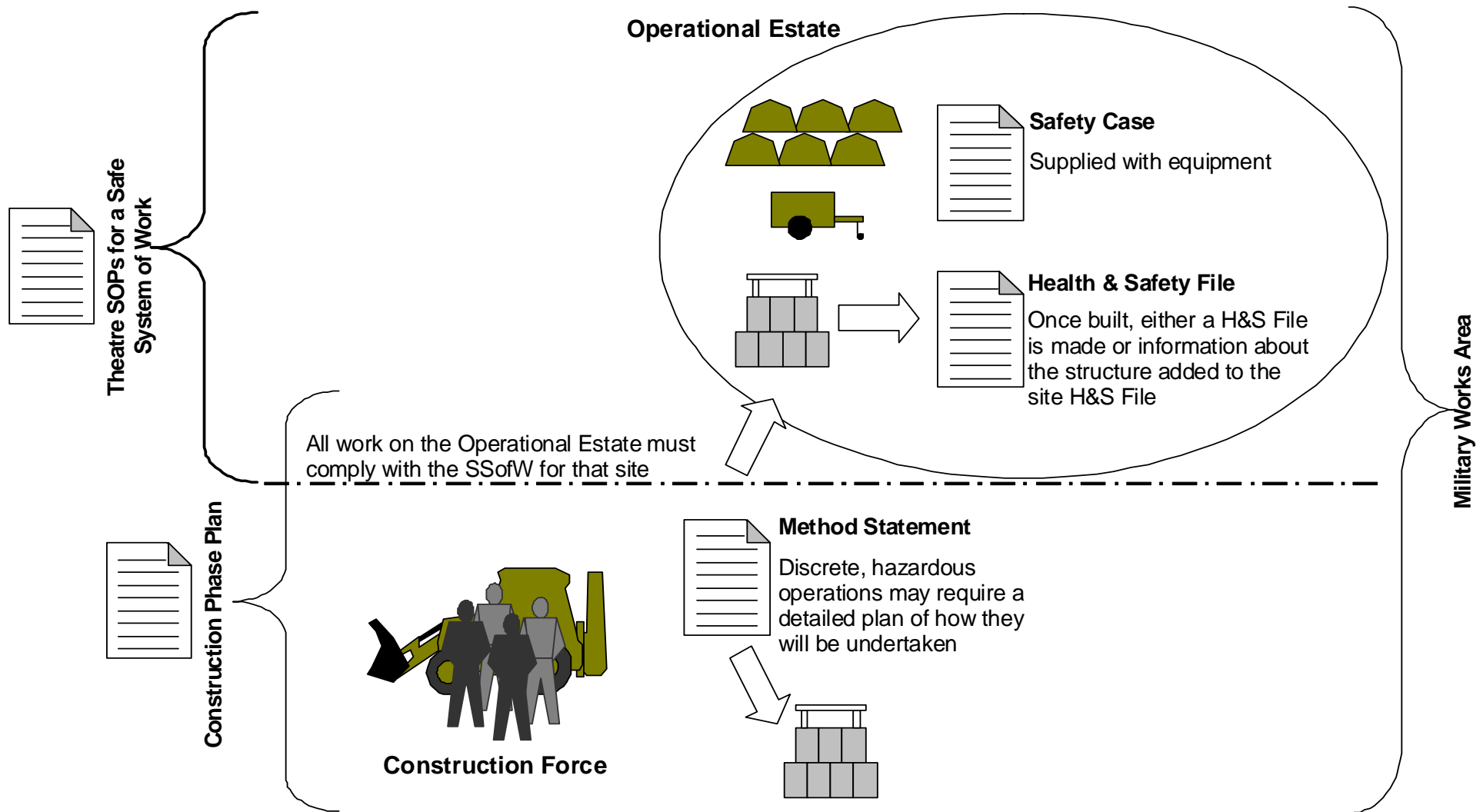


Figure 10.1 – The inter-connection of safety documentation systems.

1023. **Safety Case.** As equipment is inherently mobile, each item of equipment infrastructure should have an equipment Safety Case associated with it rather than the place in which it will be used. The Safety Case describes how the equipment may be operated and maintained and what it may be used for. Inherent in a Safety Case is the assumption of mobility, for example, in the case of equipment infrastructure, the person who sets something up will probably also operate and then dismantle it.

a. **Production of Safety Cases.** Safety Cases are drawn up by DE&S in accordance with JSP 454 Part 2 *Land Systems Safety and Environment Protection*.

b. **Operational Dispensations.** The Operational Dispensation Process is set out in JSP 454 Part 2, Leaflet C4 *Operational Dispensation Process*. It is designed to support in-theatre commanders, who for operational reasons, need *routinely* to use equipment outside its safe operating envelope. Dispensations must be made through PJHQ J3 EC.

1024. **Safety Rule Books.** Infrastructure, as understood by most people in the UK, is immobile/static. Bridges, buildings, and power distribution systems exist in one place, rarely, if ever, moving. Safety Rule Books (SRB)¹⁶ are drawn up in JSP 375 *Health and Safety Handbook*, Volume 3; they describe how the infrastructure may be operated and maintained and what it may be used for. Inherent in SRBs is the assumption that those who undertake this work have the time and opportunity to become familiar with the estate in which the infrastructure exists. SRBs are the cornerstone of a functioning facilities management system.

1025. **Method statement.** Following a risk assessment, a method statement is drawn up to explain how some discrete, complex and hazardous construction activity will be undertaken. It explains the control measures that will be put in place.

1026. **Construction phase plan.** Following a series of risk assessments, a construction contractor will determine how he will undertake the construction of an item of infrastructure. This construction phase plan will record the

¹⁶ Previously known as Safety Rules and Procedures (SRP).

health and safety arrangements, site rules and any special measures for construction work.

1027. **Health and Safety File.** On completion of construction, a Health and Safety File¹⁷ should be produced. It contains information relating to the construction project that will help to reduce the risks and costs involved in future construction work, including cleaning, maintenance, alterations, refurbishment and demolition. It is very similar in this respect to an Equipment Safety Case.

1028. **Theatre SOPs.** Theatre SOPs are used to tie together safety documentation and describe how an SSoW will operate. Theatre SOPs must be structured, kept up to date, and be in a written form.

Section 5 – Safe System of Work

1029. **Safe System of Work.** Electrical switchgear, and issued equipment fuel pumps, amongst other things, should all be 'safe' by way of their design and installation.¹⁸ However, in order to repair/maintain it, or construct new infrastructure, the *safety envelope* may have to be breached; the electrical cabinet may need to be opened, fuel lines cut, and equipment operated outside its design parameters. This exposes people to risk. A Safe System of Work (SSoW) is a structured series of procedures and control measures that limits the risk during this period of exposure. The product of a risk assessment by a competent person, an SSoW aims to establish a safe person, equipment, practice and place. Typical activities covered by an SSoW are:

- a. Work with electricity.
- b. Work in confined spaces.
- c. Work on fuel systems.
- d. Work on boilers and pressure systems.

¹⁷ This is a requirement of the Construction (Design and Management) Regulations 2007.

¹⁸ As explained in the equipment Safety Case.

- e. Work with medical gas pipelines.
- f. Work at heights.
- g. Excavation (permit-to-dig).

1030. **Application to the operational estate.** It is usually not reasonably practicable to apply the provisions of JSP 375 *Health and Safety Handbook* fully across the entire operational estate. However, following the principles set out in Section 3, the aspirant target for an operational theatre is the full application of the JSP. An explanation in theatre SOPs should be given as to why and where this is not possible and what mitigating measures have been adopted instead.

1031. **Authorised Personnel.** A central feature of an SSoW is the selection and appointment of authorised personnel to oversee the process. A key element in the assessment of competence is adequate familiarity with the actual estate. This is likely to be almost impossible across the full estate, for operational reasons. Nevertheless, a formal assessment of competence must be undertaken by the military chain-of-command.

- a. **Main bases.** Main bases endure longer and are likely to be supportable by a routine contractor presence. This makes it feasible to establish a SSoW that approximates well to JSP 375. The Infrastructure Support Provider (ISP) contractor can more readily establish Authorised Engineers (AEs) and Authorised Personnel (AP) in accordance with the JSP.
- b. **Tactical bases.** Tactical bases will always remain a challenge. Whether and to what extent, an SSoW is applied should be clearly set out in theatre SOPs.

Section 6 – Safety issues

1032. **The designer.** A designer carries a number of safety responsibilities. Unfortunately, it is not always clear to people when they are considered to be a ‘designer’. To clarify:

a. **Using standard designs.** Standard designs are merely templates. Whilst every care should be taken to give a proper account of safety, they cannot address all the factors that arise when it comes to build or assemble the item. This responsibility rests with the person who has decided to use the standard design as the solution to a real world requirement. The act of selecting a template solution therefore makes that person the ‘designer’ for *that specific, actual structure or facility*.

Insight 10-7: Even if you chose to use a standard design template, the act of choosing to apply that solution makes you a ‘designer’.

b. **Deviating in any way from designs whilst constructing.** Often on-site problems arise when trying to follow a design; incorrect dimensions, different material from that specified, or shortage of materials. Ideally, the designer’s advice should be sought on how to overcome the problem. If the construction force makes modifications without clearance from the designer, then the construction force also takes on design responsibilities.

Insight 10-8: If you make on-site modifications to designs then you also become a ‘designer’.

1033. **Design competence.** There is often confusion as to who may authorise designs for construction. A critical faculty of any professional engineer is an understanding of the limits of their own competence. If an engineer feels unable to authorise a design he/she should not do so. However, depending on the circumstances, this may possibly result in a requirement for his/her reassessment and remedial training. This does not

preclude Theatre giving specific instructions in its SOPs as to who is deemed competent to do so. As a guide (only):

- a. **Pre-worked, template designs.** Designs that stay within published Military Engineer guidance may be used without recourse to an infrastructure specialist. However, a specific check must be made to ensure that local circumstances do not invalidate the design (for example, unusual foundations, changes required to the design, additional loads, or material of a quality other than that specified).
- b. **Anything else.** For anything else, advice must be sought from the Military Design Authority (MDA), who will advise on the appropriate level of competence required. For example, structural designs and any modification to existing buildings are highly likely to require a Professionally Qualified Engineer's (PQE's) approval.

1034. **Contractor competence.** Although an assessment of contractor competence is made at the award of a contract, this may subsequently deteriorate. Contract Sponsors are responsible for monitoring contractor competence throughout the life of the contract. If tasked, the MDA may do this on their behalf. Again, this is another reason why it is important to be an intelligent customer when deployed.

1035. **Structural integrity.** The structural condition of some expedient and/or indigenous structures may deteriorate particularly rapidly. Some form of regular, recorded inspection regime is considered good practice.

1036. **Safety of electrical power and other utilities.** Whether indigenous, constructed or equipment utility solutions are used, some form of regular, recorded inspection regime is considered good practice.

1037. **Archiving records.** Theatre SOPs, and other contemporaneous safety records, should be periodically archived and retained in accordance with PJHQ's instructions.

1038. **Handing-over the operational estate.** When handing-over responsibility for elements of the operational estate, the safety policy and regulations that the recipient nation uses is a matter for them to determine.

However, it is good practice that we should hand over *a copy* of the relevant health and safety information that would be required had that recipient have been a UK operator, for example, Health and Safety Files, and Safety Cases.

1039. **Applying the Construction, (Design and Management)**

Regulations. The Construction (Design and Management) (CDM) Regulations 2007 have a significant impact on the way infrastructure support is delivered on the operational estate. They should be considered to apply to all work commissioned, regardless of the nationality of the contractor,¹⁹ unless the principles of application set out in Section 3 have been applied. Unfortunately, not all of the CDM Regulations can be easily applied in a military works area.

- a. **Notifiable projects.** The CDM Regulations describe which projects should be considered as notifiable. Projects on the operational estate may still be categorised as notifiable and non-notifiable. However, Operations Security (OpSec) must never be compromised. It is therefore most unusual to consider notifying the HSE of the project. Instead, notification should be sent to the CAA&I. They can advise on who else, if anyone, should be notified.
- b. **Client.** The Client bears a number of responsibilities under the Regulations. There must always be a Client, but it is often hard to determine who is best placed to carry out that role. Where funds have been authorised through a Financial Delegation, the Contract Sponsor is considered to be the Client, unless they have the agreement of someone else to act in this role. Where this is not applicable, the person tasking the construction force is considered to be the Client. To avoid a conflict of interest, the construction force can never be its own Client; some separate individual/organisation must accept this role.
- c. **Construction (Design and Management) Coordinator and Principal Contractor.** Notifiable projects require the appointment of a CDM Coordinator and Principal Contractor. The advice of the Joint Force Engineer (JFEngr) should be sought as to the most

¹⁹ Or, indeed, cap badge or Arm of Service.

appropriate candidates. The CDM Coordinator is usually drawn from the Works Group or other MDA.

Chapter 11 – Environmental stewardship

Section 1 – Policy and regulation

1101. **Policy and its application.** Chapter 10 sets out the key elements of the Secretary of State's (SofS's) policy on the application of environmental legislation on the operational estate. Details of MOD policy are contained in JSP 418 *MOD Sustainable Development and Environmental Manual*.

Furthermore, where appropriate, NATO provisions may also be applied.^{20,21,22,23} This Chapter aims to explain how these policy documents are applied in practice on the operational estate. Further detailed guidance is given in JTTP 4-05.2 *Lands and Environmental Procedures*.

1102. **Role of the Defence Infrastructure Organisation.** The Environmental Liability Management Group (ELMG) within the Defence Infrastructure Organisation (DIO) gives practical advice on the application of environmental policy. Through the production of a site-specific Land Quality Assessment (LQA), they are able to make an estimate of the environmental liability that we may face.

1103. **Stewardship.** Central to the management of environmental issues is the concept of 'stewardship'. Any base or in-theatre training area *that we control* is in our entrusted care. We must manage our activities responsibly, minimising the potential harm to health and the environment, in anticipation of handing the estate over to others at the end of the operation. Stewardship needs planning.

1104. **Reputation.** Environmental issues may arise long after the successful conclusion of an operation. The reputation of British forces could be at risk if we were shown to have acted irresponsibly.

1105. **Risks.** Failure to identify and address an environmental impact may place a number of things at risk.

²⁰ NATO STANAG 7141 *Joint NATO Doctrine for Environmental Protection during NATO-Led Military Activities*.

²¹ AJEPP-1 *Environmental Protection Standards and Norms for military compounds in NATO Operations* (Draft).

²² AJEPP-2 *Best environmental protection practices for military compounds in NATO Operations* (Draft).

²³ AJEPP-3 *Environmental Management Systems in NATO Operations* (Draft).

- a. **Human health.** There may be a risk of harm to human health, both to personnel at the site and to the local community.
- b. **Environment.** The local plants, wildlife, water quality and other aspects of the environment may be at risk.
- c. **Other people's property.** The property of others may be at risk.

1106. **Liability.** If any of the above is damaged, through actions or omissions by the MOD during our stewardship, there may be a liability to pay costs or damages. Often problems are likely only to become apparent some time after the end of the operation. Contemporaneous records and evidence of responsible stewardship must therefore be collected during the operation if the MOD is to be able to defend its reputation and the national purse against such claims.

Insight 11-1: Environmental stewardship is about preserving human health, looking after the land with which we have been entrusted, safeguarding the reputation of the British military and limiting our future liability for claims well beyond the end of an the operation.

Section 2 – Environmental management

1107. **Poor or non-existent local standards.** Very often there are either inadequate or non-existent local standards for the management of the environment. Nevertheless, our forces should apply UK standards and best practice where it is *reasonably practicable* to do so.

1108. **Pollutant linkage.** In order to manage the environment one must identify potential sources of contamination (hazards) and the things that may be affected by them (receptors). UK best practice is referred to as establishing a *pollutant linkage*. For there to be a risk, three basic elements must exist:

a. **Source of pollution.** A contaminant is a substance that is in, on, or under the land and has the potential to cause harm or to cause pollution of the surrounding environment. Examples include:

- (1) Fuel leakage and spills.
- (2) Ordnance (this includes our own and any we have *inherited*).
- (3) Waste (sewage, domestic, excavation and demolition).
- (4) Radioactive materials.

b. **Pathway.** The pathway is the route or means by which a receptor can be exposed to, or affected by, a contaminant. Examples include:

- (1) Ingestion.
- (2) Inhalation.
- (3) Skin contact.
- (4) Migration of liquids and vapours through soil or groundwater.

c. **Receptor.** A receptor is something that could be adversely affected by a contaminant. Examples include:

- (1) Human health (military personnel and locals)
- (2) Environment (plants and animals, crops and water supplies)
- (3) Property (adjoining, or in the vicinity of, the site)

1108. **Management process.** It is important to reduce uncertainty by following a logical management process. The flow charts at Annex 11A and 11B set out the basic process.

a. **Establish a baseline as quickly as practicable.** An Environmental Baseline Survey (EBS) is the initial step in identifying

potential environmental problems at a site. An EBS should be conducted as soon as circumstances allow. The EBS should identify any pre-existing problems, hazardous contaminants and sensitive receptors. JTTP 4-05.2 contains a template EBS.

b. Investigate liabilities, and identify and monitor problems.

An Environmental Conditional Report (ECR) is a live, working document drawn up for the duration of our stewardship of a site. Relevant information is either recorded, or a direct reference made to it. It is reviewed and amended as appropriate. This can then help formulate a response and the control measures to be adopted.

c. Establish good practice as SOPs. Through the use of SOP, enforced by the chain-of-command, we should establish good practice as routine practice; especially with regard to the sources of contamination outlined above.

1111. **Preparation for handover.** Prior to handover, the environmental condition of the site should be established to allow an assessment of the environmental liabilities. This is done, under DIO ELMG advice, through a Land Quality Assessment (LQA). The LQA forms part of a Post-occupation Survey (POS), details of which are in JTTP 4-05.2. The LQA takes information from the ECR to identify the source-pathway-receptor linkages. Each linkage is assessed to determine its likelihood and severity. The LQA is shorter and more concise than an ECR. Remediation may be required for which adequate financial provision must be made. There are two key steps:

a. Establish the level of liability. The liability risk associated with an environmental hazard is closely linked to the sensitivity of the receptors and the likelihood that a contaminant will reach them. If we have been unable to determine the level of liability, this fact should be highlighted to the DIO ELMG.

b. Mitigate or remedy. It is reasonable to balance the cost of mitigating an impact against the cost of remedying it, or our anticipated liability. This cost is both a financial one and also the impact on the operation.

Annex 11A – Environmental procedures during occupation

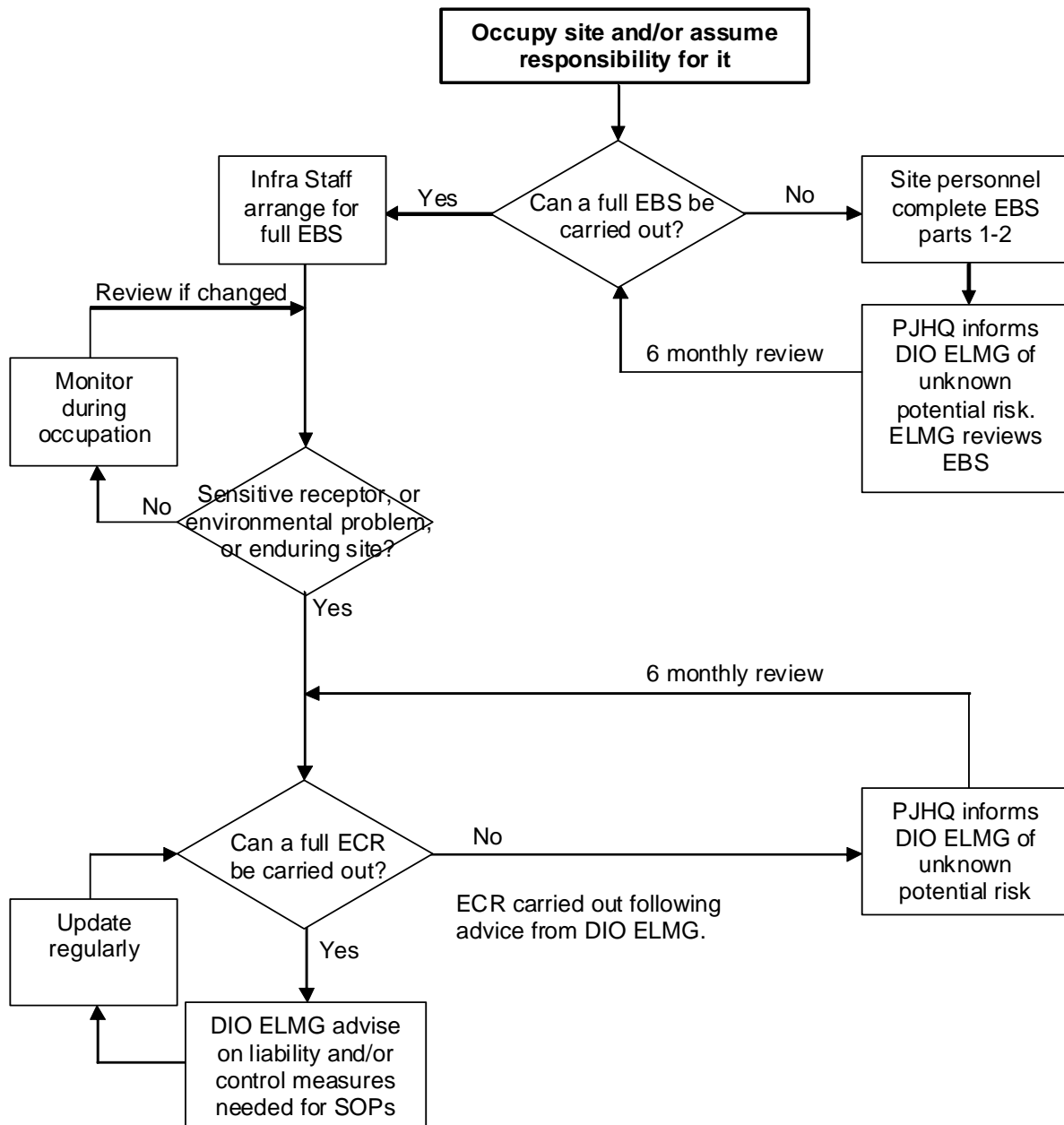


Figure 11A.1 – Environmental Baseline Survey and condition reporting

Annex 11B – Environmental assessment and handover

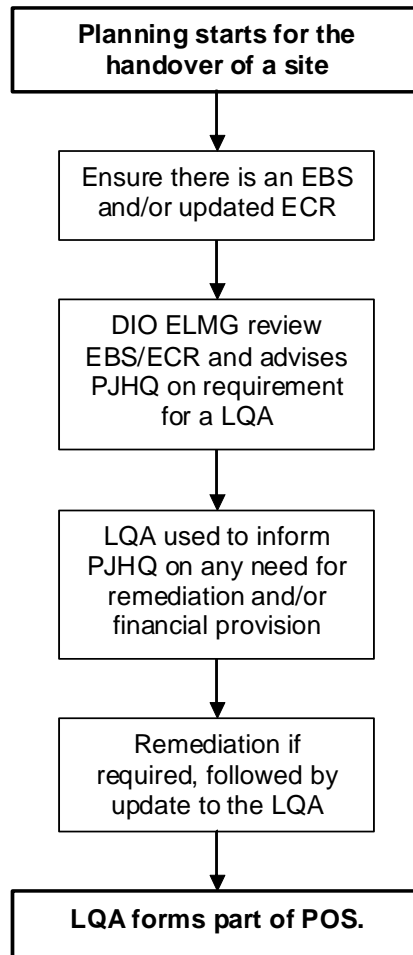


Figure 11B.1 – Environmental assessment prior to handover

Chapter 12 – Finance

Section 1 – Policy and financial governance

1201. **Policy.** MOD financial policy is set out in detail in Joint Service Publication (JSP) 462 *Financial Management Policy Manual*. Rather like the MOD's expansive collection of Health and Safety policy publications, there are several other JSPs giving specialist guidance on specific aspects of financial policy, for example, JSPs 472, 501, 507 and 525. Further reference is made in this document to some of these publications.

1202. **Finance Staff.** Finance is a J8 function. For members of the Infrastructure Staff to be successful, they must have a close and effective working relationship with the J8 Financial Staff in their headquarters. Chief Accountant (Ch Acct), Permanent Joint Headquarters (PJHQ) is Chief of Joint Operations' (CJO's) focal point for advice and guidance on finance and accounting matters. Within operational theatres, the Civil Secretary (CivSec) staff provides financial advice and guidance. CivSec advice should always be sought in the first instance, before referring to PJHQ.

Insight 12-1: For members of the Infrastructure Staff to be successful, they must have a close and effective working relationship with the J8 Financial Staff in their headquarters.

1203. **Value for Money.** Value for Money (VfM) is best defined in JSP 507 *MOD Guide to Investment Appraisal and Evaluation*. Value for money is the 'optimal combination of economy, efficiency and effectiveness'. Value for money describes the trade-off between time, cost and effectiveness. This does not necessarily mean choosing the lowest cost bid, nor highest performance regardless of the consequences. Value for money is a relative concept that involves the comparison of potential and actual outcomes of alternative procurement options. Value for money is only meaningful where options exist. Where there is only one option then there is no real way of assessing value for money and in these circumstances the key is to achieve the most acceptable cost.

1204. **Project Evaluation.** Project Evaluations¹ (PE)s are essential if the MOD is to learn from mistakes. The Business Case (BC) author should consider: who is responsible for conducting the project evaluation (normally the project sponsor) and when it would be most appropriate to conduct it. Project evaluations must be completed within three months of the capital expenditure end date or contract start date. Normally such a project evaluation will concentrate on the financial and commercial aspects of the project. However, there may be many lessons to be learned regarding the technical requirement, delivery and operational capability. This may require a more extensive and in-depth project evaluation.² These project evaluations are arranged through PJHQ's Infrastructure Staff.

Section 2 – Funding

1205. **Financing the project.** It is important to know how a project, or element of infrastructure support, will be paid for. This is not something that military personnel readily think of first. Nevertheless, it influences what can be authorised, and how it may be delivered.

Insight 12-2: Understand from the outset how a project will be funded. It influences what may be authorised and how it may be delivered.

1206. **Net Additional Cost of Military Operations.** Because they cannot be forecasted, the cost of overseas military operations is not included in the Defence budget. The MOD undertakes to absorb the cost of an operation where it is able to do so without detriment to other commitments, however, the Secretary of State (SofS) retains the right to make a claim on HM Treasury's Reserve for the costs of major operations. The mechanism by which funding is drawn from the Reserve in this way is known as the Net Additional Cost of Military Operations (NACMO) process.

1207. **Significance of Net Additional Cost of Military Operations Funding.** If someone has an operational requirement and its solution needs funding, they must prepare a business case to explain why funds are needed and which course of action, of all the possible options, represents best value

¹ Formerly referred to as Post-Project Evaluations (PPE). Whilst a Project Evaluation is retrospective, the term 'post' is no longer used as evaluation should be seen as a through-life activity.

² The extent and depth should be commensurate with the value, length and complexity of the project.

for money. This business case is then presented to a named individual with the delegated Financial Authority to draw on the Reserve using the NACMO process. After assessing the operational need and merits of the selected course of action, financial approval may then be given – to address the specifically stated operational requirement. NACMO is not a fixed budget with which to plan and manage the operational estate, it is just a mechanism for obtaining funds. The significance of this is therefore:

- a. **It must only be used for the specific purpose for which it was approved.** Once financial approval is given, funds may only be used for their specifically stated purpose. Even if there is an *under-spend*, funds cannot be *flexed* to pay for something else. If there is an operational requirement for something else, a fresh case must be made. Similarly, unless specific authorisation is given, the scope of the original project (or the requirement on which it is based) may not be expanded beyond that originally described in the business case.
- b. **There will never be enough staff to process business cases.** There is no set Departmental limit on the number of times Financial Authorisation can be exercised. It may be given as many times as needed by the operation, provided that an appropriate Investment Appraisal is conducted. This means that budgetary constraints are not the limiting factor. They are instead the capacity of contractors to undertake projects and the capacity of the staff to plan work, examine options, prepare, and review business cases. Therefore the business case process will very often appear to be the natural choke point on the output of work. This is not bureaucratic inefficiency; it is merely a product of the funding process.

1208. **Equipment and stock funding.** Chapter 3 outlines how equipment is funded. JTTP 4-05.3 *Infrastructure Project Management* also explains how construction materiel is paid for.

- a. **Equipment Programme and Equipment Support Programme.** The Equipment Programme (EP) is used to fund new equipment and possibly mid-life capability improvements. The Equipment Support Programme (ESP) is used to maintain it. Therefore the equipment

manager may be able to fund improvements and modifications to deployed equipment infrastructure.

b. **Purchase of consumable stock items.** Some consumable items of infrastructure may be obtained from Defence Equipment and Support (DE&S) stock through the Joint Support Chain, for example, gabion baskets and scaffold towers. Items of 'stock' are defined as being expendable and below the value of 'an asset' (ca £20k). The cost of replenishment of stock is known as Spend on Stock Purchase (SOSP). DE&S charges SOSP to the operation. However, this means that the full cost of a construction project may not be completely determined at the point at which financial approval is sought. This is explained in more detail in JTTP 4-05.3 *Infrastructure Project Management*.

c. **Urgent Operational Requirements.** The Urgent Operational Requirement (UOR) process obtains equipment and is funded through NACMO. The Equipment Capability (EC) desks in theatre and at PJHQ control this process.

1209. **Shared funding.** Under Collective Responsibility (CR) arrangements, funding may be shared with our allies and coalition partners. The NATO Security Investment Program (NSIP) is explained in Chapter 9. Bilateral or multilateral agreements may also be made, either as a standing arrangement, or on a case-by-case basis. In practice, sharing funding often complicates the requirement capture process and leads to slower delivery. It is often more efficient to have one nation lead and the others providing reimbursement.

Insight 12-3: If a project benefits any non-UK military organisation, ensure that funding arrangements are resolved first; otherwise the business case may be delayed.

1210. **Reconstruction and stabilisation projects.** Chapter 1 explains how some reconstruction projects that support the aim of stabilisation, may also benefit the Force more directly; a road intended to open up a market may also avoid likely Improvised Explosive Devices (IED) or ambush *black*

spots. Reconstruction work has its own, separate methods of funding. Where the primary benefit is stabilisation, funding through the NACMO process is not appropriate. In cases where there is mixed benefit, any business case that targets the NACMO process must explain why it is not appropriate to fund the work fully or partially from these other sources.³ Stabilisation funds vary from operation to operation. In general there are four main sources of reconstruction funds:

- a. **UK funding; the Conflict Pool.** The Department for International Development (DFID) controls funding from the UK for development projects and for humanitarian disaster relief. The FCO and MOD also have a range of programme funds, each supporting its strategic priorities. The *Conflict Pool* is an organisational framework that brings together DFID, FCO and MOD, and is the principal cross-government mechanism to prevent and manage overseas conflicts that impact on UK national security, broader strategic interests, or our ability to achieve wider foreign policy and development objectives. All funding decisions and activities delivered through the Pool are based on joint analysis and tri-departmental strategies.⁴
- b. **Collective donor funding.** Coalition nations may set up a collective fund such as the NATO Post Operational Emergency Relief Fund.
- c. **Third party benefactor funding.** A third party benefactor may also provide funds. The US has a long history of making reconstruction funds available to its allies on a case-by-case basis.
- d. **Host nation, national funding.** The host nation may be in receipt of funds from international donors that can be used for development.

Section 3 – Financial authority and approval

1211. **Authority and approval.** Financial Authorisation is the formally sanctioned *ability* to commit a limited sum of money, for a specific purpose,

³ Evidence of a rejected application for stabilisation funds will suffice.

⁴ *Working Effectively in Conflict-affected and Fragile Situations*, DFID, March 10.

through an act of financial approval. It is important not to confuse authorisation with approval.

1212. **Time.** The time required to process a business case to obtain financial approval, must be taken into account during planning. Business cases should not be submitted⁵ against possible courses of action solely to avoid delay. Only actual courses of action can be given financial approval.

Insight 12-4: The time required to process a business case to obtain financial approval must to taken into account during planning.

Insight 12-5: Business cases should not be prepared against possible courses of action solely to avoid delay. It should be: concept of operations, then plan, then business case – not the other way round.

1213. **Financial and Commercial Authority.** Three elements are needed to commission infrastructure work using the NACMO process. The power to exercise these elements is kept separate and not vested in one person.

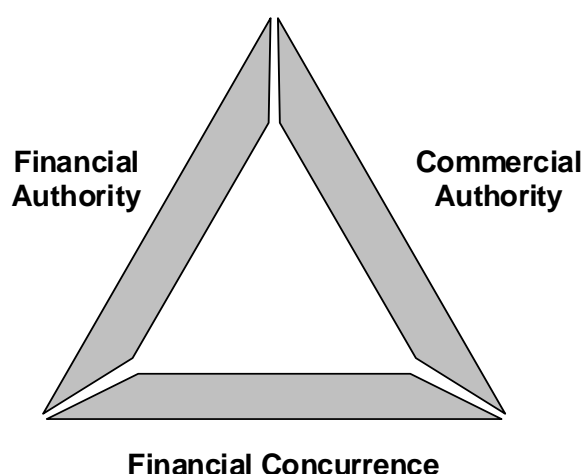


Figure 12.1 – The three elements required to spend money

⁵ Although they may be prepared.

a. **Financial Authority.** Financial Authority is granted to commanders and flows down an unbroken chain of delegation from the MOD Centre. It is given to named individuals through a signed letter of delegation.⁶ That letter stipulates how the Authorisation may and may not be used. A commander may delegate Financial Authority to subordinate staff at his discretion and only if his letter of delegation permits him to do so.

(1) **Whoever controls money, controls the Infrastructure Development Plan.** It is important not to allow too much Financial Authority for infrastructure related purchases outside the Infrastructure Staff as this leads to uncoordinated development. For example, a large Financial Authorisation for timber and other construction materials outside the control of the Infrastructure Staff can generate an extensive construction programme outwith any Infrastructure Development Plan. Those with whom responsibility rests for delivering infrastructure support should not hold any significant Financial Authorisation.⁷

(2) **Typical financial limits.** Although it varies from operation to operation, typical financial limits are shown in Table 12.1.

⁶ PJHQ J8 ensures financial delegations are in place.

⁷ Conversely, Infrastructure Staff may only hold Financial, and not Commercial Authorisation.

Ser	Financial Authority	Source of delegation	Value (£)	Remarks
(a)	(b)	(c)	(d)	(e)
1	CJO	MOD	10M	PJHQ
2	COS (Ops)	CJO	5M	PJHQ
3	ACOS J1/J4	CJO	1M	PJHQ
4	Comd NSE	CJO or via ComBritFor	500 – 250k	Theatre
5	Others under NSE	Comd NSE	<500k – 250k	Infrastructure Staff at the discretion of Comd NSE

Table 12.1 – Typical limits of Financial Authorisation as applicable to the funding of operational infrastructure

b. **Commercial Authority.** Commercial Authority is granted to allow the holder to enter into a contract on behalf of the MOD. It is explained in detail in Chapter 6.

c. **Financial concurrence.** Finance Officers (J8 staff, CivSec) do not hold Financial Authority *ex portfolio*; they exercise their Financial Concurrence. They are trained in MOD accounting procedures and ensure they are followed. Their Financial Concurrence is required for any contractual arrangement. Concurrence is, in effect, agreement by a Finance Officer, that funds are available and that the purpose for which funds are sought, is within MOD procurement rules.⁸ Financial Concurrence must be obtained before Financial Authority is exercised on the operational estate.

⁸ This includes an assessment of governance, propriety, and assurance that expenditure is not novel and/or contentious.

1214. **Geographic dispersal of staff.** Local procedures must ensure that any geographic separation of individuals holding financial and commercial delegations does not result in delays in delivery. This can influence PJHQ's decision on where to place Infrastructure Staff in theatre.

1215. **Splitting a project up to reduce its apparent cost.** A project may not be split up into a series of smaller ones in order to keep the work within a delegated Financial Authorisation.

1216. **Novel and/or contentious.** Whatever the value of the project, financial and commercial delegations are invalidated if it is novel⁹ and/or contentious.¹⁰ If there is any doubt whether a project is novel or contentious, PJHQ J8 must be consulted. The following, non-exhaustive list, gives examples of projects that may be deemed novel or contentious:

- a. Issues that may have an adverse political impact or result in criticism of the MOD.
- b. Build-to-gift.¹¹
- c. Joint or reimbursed funding.
- d. Projects with mixed purposes.
- e. Projects that involve a change in policy or run counter to an established campaign policy and planning.

1217. **Limit-of-Liability.** Financial approval is given to cover the estimated cost of a project plus any allowance for project risk; this is known as the Limit-of-Liability (LoL). A project must not be allowed to exceed its limit-of-liability. The person to whom financial approval is given, must monitor costs, especially those associated with Variation Orders.

1218. **Sequencing commercial and financial activity.** As explained in Chapter 4, contract procurement should be managed as a project. The

⁹ Novel expenditure describes expenditure on goods and services not previously supplied or purchased, for which the MOD has no funding authority, or for which there are no existing rules to suggest the proper course of action.

¹⁰ Contentious expenditure is defined as goods and services that do not constitute value for money and/or are likely to cause public or political controversy or repercussions for others, such as other Departments.

¹¹ For example, the construction of facilities, which have already been determined, that will pass to the host nation.

Infrastructure Staff should ensure that there is a project manager and that commercial and financial activity is coordinated in order not to incur a delay. Annex 12A gives an example based on a real case of a how both activities are sequenced.

- a. **Invitation to Tender.** Financial approval must be given before issuing an Invitation to Tender (ITT) because issuing an Invitation to Tender can incur tender costs if financial approval is not subsequently granted. However, PJHQ J8 (on advice from DIO) may lift this prohibition in exceptional circumstances.
- b. **Letters of Intent.** A Letter of Intent may only be used after financial approval has been given but before full contract documentation has been prepared. They give poor protection to the Authority and their use is not good practice. They may only be used exceptionally and only with specific PJHQ J8 approval (on advice from the Defence Infrastructure Organisation (DIO)).

Insight 12-6: It is forbidden to enter into a Contract without financial approval.

1219. **Exceeding Financial Authority.** If additional funding is needed once a project is underway, an uplift must be sought *before* the limit-of-liability is breached. The person who gave financial approval to the original business case should give approval for the uplift. However, if this aggregate total exceeds their delegated limit, approval must be sought from someone with a greater financial limit.

Examples based on Table 12.1:

- a. Original project cost; £450k – Fin Auth from Comd NSE. Uplift of £60k now required – Fin Auth now sought from PJHQ ACOS J1/J4
- b. Original project cost; £750k – Fin Auth from ACOS J1/J4. Uplift required for £1k – Fin Auth sought from ACOS J1/J4 (not Comd NSE).

Section 4 – Other financial issues

1220. **Contractor insurance.** The MOD will normally, as part of the tender return, expect a contractor to confirm that they have the appropriate level of insurance, or highlight any exclusion. On operations, however, the MOD will often provide *DEFCON 661* War Risk indemnity to UK-based Contractors on Deployed Operations (CONDO)-compliant contractors. This means that if the contractor, for example, loses equipment or vehicles through indirect weapons fire, the MOD pays for its replacement rather than expecting the contractor to claim on his insurance. If we accept a contractor who does not have insurance, we open ourselves up to a claim for damages. In effect it results in the MOD carrying a greater financial risk than we would normally. Local companies invariably do not have insurance that covers these risks. DIO advice must be sought in all cases involving War Risk indemnity.

1221. **Hospitality.** All personnel must follow the rules in JSP 462 *Financial Management Policy Manual* on accepting hospitality and recording any accepted.

1222. **Asset Registers and the value of the operational estate.** The theatre infrastructure Asset Register may also be used to record the value of the operational estate. The assignment of value is a matter for the J8 Financial Staff.

1223. **The cost of codified items.** Codified items are supplied through the Joint Supply Chain in response to an authorised operational demand; no financial approval is required. The basic price of these items is usually known, and may be used to inform an Investment Appraisal. However, money should not be requested in the business case to pay for these items.¹²

¹² This is explained in detail in JTTP 4-5.3 *Infrastructure Project Management*.

Annex 12A – Sequencing commercial and financial activity

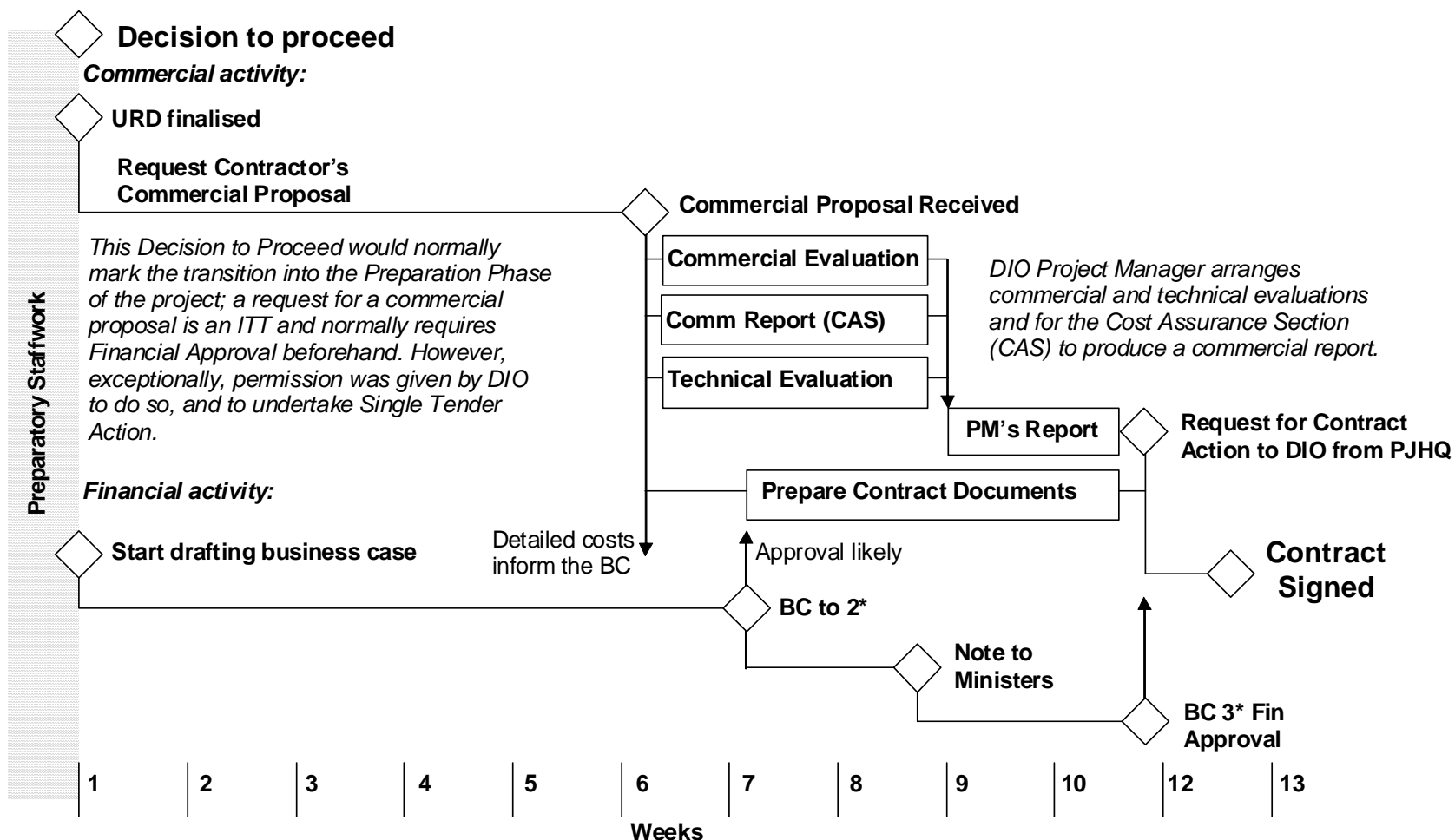


Figure 12A.1 – Example of the coordination of commercial and financial activity, based on a large project

Chapter 13 – Operational Investment Appraisals and business cases

The provisions within this Chapter are ONLY for the preparation of Investment Appraisals and business cases in operational environments.

Section 1 – Investment Appraisals

1301. **Policy and guidance.** JSP 507 *MOD Guide to Investment Appraisal and Evaluation* is the reference document on which the guide in this Chapter is based. As explained in Chapter 12, further guidance should be obtained from theatre Civil Secretary (CivSec) and PJHQ J8. As explained in the previous Chapter, no Financial Authorisation can be made without formal financial concurrence from J8 staff in theatre or at PJHQ. Any such approval will be based on adherence to the provisions of this Chapter.

1302. **Investment Appraisals and business cases.** An Investment Appraisal (IA) is a formal review of Courses of Action (COA) and their costs; it forms the core of a business case (BC). A business case is therefore the formal presentation of an Investment Appraisal. The appraisal itself is a systematic process, which entails being clear about objectives, thinking about alternative ways of meeting them, and estimating and presenting the costs and benefits of each potentially worthwhile option. It enables decisions about the use of resources to be taken with a better understanding of their implications. The Investment Appraisal sets out the objectives to be met; identifies a range of options which might meet them; and provides an objective assessment of the costs and benefits of each, together with an assessment of their associated risks, to indicate which offers Value for Money (VfM).

Insight 13-1: It is important that an Investment Appraisal is carried out in an open-minded and objective manner and is not used to support a decision that has already been made.

1303. **The value of conducting an Investment Appraisal.** An Investment Appraisal serves three useful purposes:

- a. **Support reasoned decision-making.** An Investment Appraisals function is to lay out and assess the information needed to make a sound financial decision. It is an essential part of the search for, and demonstration of, value for money.
- b. **Support an application for financial approval.** A thorough Investment Appraisal that is well documented and presented will help to demonstrate that the project is soundly based and will smooth the process of gaining approval.
- c. **Provide a written record.** The Investment Appraisal also provides a record of what was expected to be achieved by the project and the factors on which the decision was based. It will be an important starting point for any later review or audit of the project, and in particular for Project Evaluation (PE).

Section 2 – Preparing a business case

1304. **Responsibility for the preparation of operational business cases.** Anyone requiring funds to deliver a project, purchase goods or services, support an activity, or for any other purpose, is responsible for the preparation of a business case; this applies whether or not they hold any financial authority.

Insight 13-2: The most common mistake is to spend an unnecessary amount of time drafting a business case, which is then sent for the first time to PJHQ with a request for financial approval. Invariably, this prompts a number of supplementary questions from PJHQ, resulting in frustration in theatre. Before starting a business case, contact theatre Civil Secretary (CivSec) staff or PJHQ J8 and discuss the requirement, course of action and supporting information that will be expected. This will avoid wasting time later.

1305. Minimum value below which a business case is not needed.

JSP 507 *MOD Guide to Investment Appraisal and Evaluation* sets no minimum value below which a business case is not needed; in effect *all* applications for funding must be supported by a business case. However, depending on operational circumstances, and subject to PJHQ J8 (Fin Ops)'s specific approval, theatre may in practice, apply a minimum value. As a *rule-of-thumb*, it should not be above £50k.

1306. Form and format. Operational factors will determine the size and complexity of a business case. Generally, the more money is sought, the greater the level of scrutiny it will receive; therefore, the greater the degree of information and supporting evidence expected. The standardised formats are provided at Annexes 13A and 13B will assist in the preparation of a business case. However, this should not deter business case authors from adding additional information to strengthen a case. The business case should use language that will be familiar and understandable, and avoid acronyms and professional jargon where there is a risk that they will not be understood. The flow chart at Figure 13.1 shows how to determine the form and format of a business case. Regardless of the level of funding sought, theatre CivSec staff may request a more rigorous business case than those shown here.

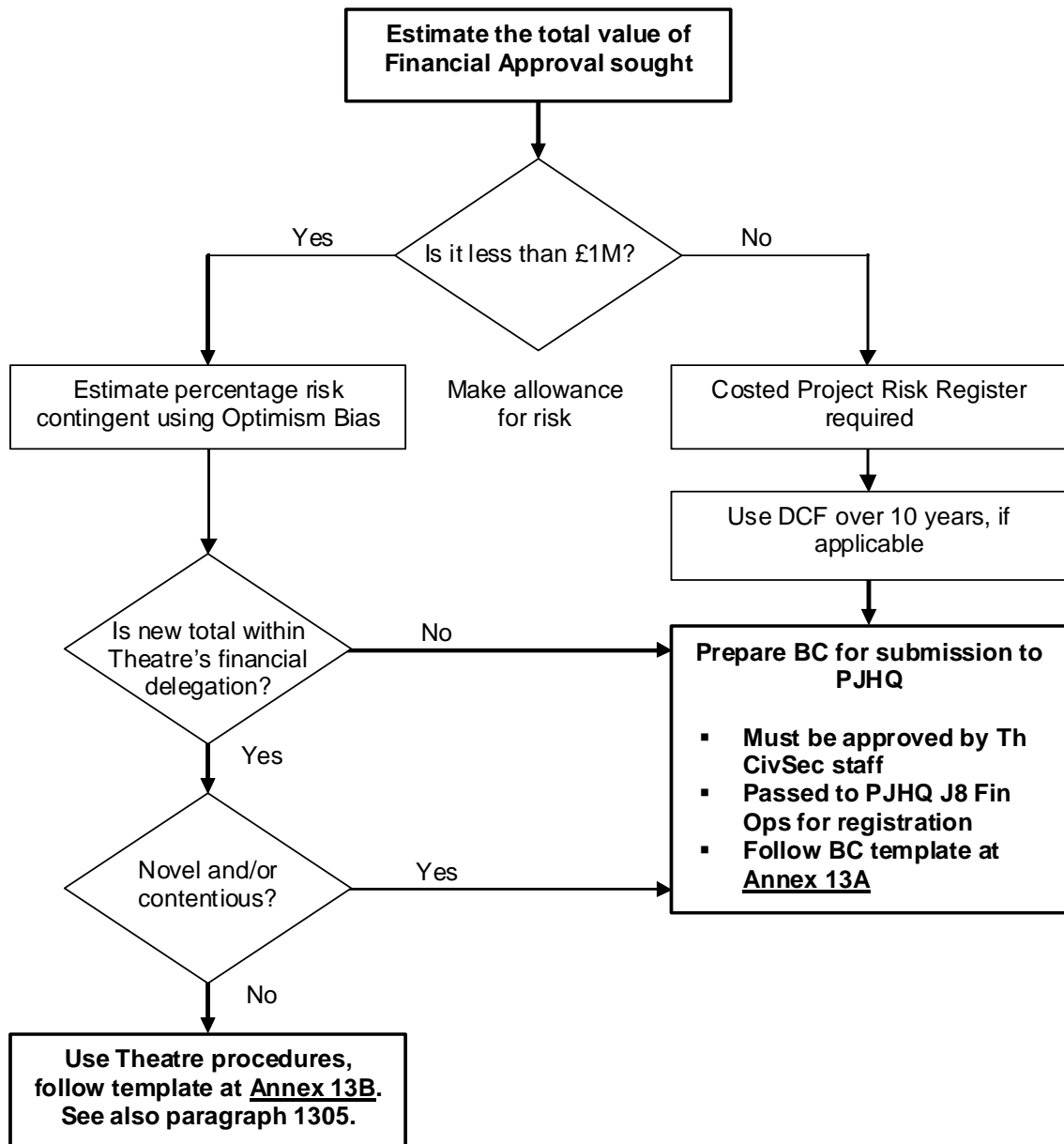


Figure 13.1 – Determining the form and format of a business case

1307. **Through life costs and PJHQ’s financial model.** The business case should consider through life costs, where relevant, with a planning life as specified in the Theatre Infrastructure Development Directive (TIDD) (typically three years). PJHQ maintains a Business Case Financial Model Template (BCMFT) spreadsheet which calculates through life costs over ten years as a more expensive option in the short-term may provide reduced

costs or efficiencies over the longer term. In most cases it is assumed that all capital builds will have a 'nil' disposal cost at the end of the life of the asset.¹ The BCMFT also makes allowance for risk. The BCMFT should be used whenever possible. If this is not possible, a basic three-point estimate should be made based on the Project Risk Register. An example estimate is provided at Annex 13C.

Section 3 – Elements of a business case

1308. **References.** Authoritative references such as endorsed staff papers should be used to add validity to a business case. All statements, throughout the document, should be factual and objective, and where references have been listed, authors should ensure they are referred to within the business case.

1309. **Executive summary.** This includes the issue, timing and recommendation. It must pass the *two-minute test*: within two minutes, the reader must be able to identify what the issue is, when a decision needs to be made by and why, and what the recommended solution is and how much it is likely to cost.

1310. **Background.** The background to the project, programme, or policy should be explained in sufficient depth so that the reader can understand why the need has arisen, and why the requirement (which should be stated explicitly) has been defined as it has. Material that is merely of historical interest should be excluded. Site plans, layouts and diagrams should be considered for inclusion as an annex, as they improve the clarity, and hence, the quality of a case.

1311. **Requirement.** The requirement must be expressed clearly and concisely in terms of the outcomes, effect, or service to be delivered. It must not be expressed in a way that anticipates or pre-emptes a particular solution, and should reflect only the absolute essentials. Without a full understanding of the requirement, it is difficult to identify all the possible methods of addressing and meeting the need. A business case may be scrutinised many months after the project has been completed by external departments to ensure that the decision made was correct, based on the information

¹ If there is a residual value, this should be noted in the business case. However, this is usually very difficult to assess.

available at the time. Do not assume the reader has the same intimate knowledge of the detail of an operation as the author, in particular:

- a. Do not use technical jargon or specialist abbreviations without explanation.
- b. Remain unbiased in presentation and do not simply reflect the desired solution.
- c. Ensure the requirement is expressed in output-related terms that do not unnecessarily restrict the number of possible options.
- d. Ensure the case provides sufficient context to enable the reader to understand the nature of the request.

1312. **Courses of action.** This area of the business case must consider, in an un-biased way, all practicable courses of action (COA) for achieving the requirement. Courses of action should initially be listed with a brief explanation of what each entails. Consideration should always be given to the 'do nothing' course of action, which may entail the acceptance of a capability gap, the consequences of which should be clearly articulated during the courses of action analysis. A clearly defined requirement makes the process of generating options much easier. Each course of action should be analysed as a standalone option, on its own merits, and not compared against other courses of action at this stage. Costs should not be discussed, nor courses of action discounted, based on cost. The analysis should consider the benefits and drawbacks of each course of action. No course of action should be rejected or ignored without a properly supported explanation. Consider using suitability (should we do it), feasibility (can we do it) and acceptability (will we be allowed to do) to assist the analysis process.

1313. **Assumptions and constraints.** Assumptions made when considering the requirement should be highlighted and appropriately justified. Any overriding or binding constraints should be explained. The assumptions and constraints stated within the business case will help shape the course of action analysis.

1314. **Costs.** Identify and quantify costs and benefits, explaining how the money will be spent for each course of action. It is vital to include calculations and assumptions in arriving at these costs. Costs and assumptions are to be entered into the PJHQ Financial Model, which has been developed specifically for use in operational environments to support operational Investment Appraisals and business cases. Good cost estimates are needed in the preparation of a business case and should comply with the following:

- a. Ensure that the costs quoted run consistently throughout the business case.
- b. Check to avoid simple arithmetical mistakes.
- c. All costs should be quoted in the same currency to allow ease of comparison. Any business case submitted to PJHQ for approval must be in £Sterling.
- d. Figures should wherever possible be based on firm estimates, quotations, reports, previous invoices, or other robust sources.
- e. Sunk costs should be ignored (costs which have already been incurred).
- f. Common costs can be excluded if they are genuinely common to all courses of action.
- g. Opportunity costs² should be included if they can be clearly identified and quantified.
- h. If using UK-based price estimates they must be adjusted to reflect local rates and realism.
- i. Explain how funds are to be expended. Do not clutter the main text with tabulated costs: only use summaries. Include any detailed tables in an Annex or Enclosure.

² The cost foregone of passing up the next best course of action when making a decision. For example, if an asset is used for one purpose, the opportunity cost is the value of the next best purpose for which the asset could have been used.

The PJHQ Financial Model will provide the Investment Appraisal output sheets as Annexes and summary sheets for inclusion within the business case, for both the Investment Appraisal and limit-of-liability (LoL). The Investment Appraisal produces a discounted cash flow (DCF) (using a discount factor of 3.5%) to take account of the time-value of money and shows an option cost at its net present value (NPV). This provides a common measure, in order to allow a comparison between different options, where different costs (and benefits) are incurred at different times. The limit-of-liability is the level of funding required to afford the cost of the preferred option in real terms, as costs are inflated using the GDP deflator (2.5%).

1315. **Sensitivity analysis.** All Investment Appraisals must contain a sensitivity analysis to test the vulnerability of options to future uncertainties. The sensitivity analysis should be based on plausible variations to the assumptions made, in order to determine, in percentage terms, by how much the key variables have to change in order to alter the net present value of courses of action and their ranking.

1316. **Selection of course of action.** The recommended solution should be supported by a logical argument showing clearly why it has been chosen, and how the various factors (the costs and benefits covered by the Investment Appraisal, the risks and uncertainties involved, other business/operational factors, security, wider policy issues and value for money) have affected the choice. Weighting and scoring tables may be used to assist the decision-making process; however, the final recommendation must be based on value for money.

1316. **Risk analysis.** Historically, projects are understated as levels of uncertainty and associated risks are underestimated. The estimate of costs should be as accurate as practicable and project risks must be reflected in those costs. Each course of action may have a different financial or delivery risk, which would require explanation. The inclusion of costs simply as unexplained 'contingencies' or other generic headings should be avoided, in favour of a properly costed risk register, where appropriate. Key risks should be assessed, evaluated and, if possible, quantified, with particular emphasis on how it is intended to mitigate or manage them.

1317. **Optimism Bias.** Optimism Bias is the demonstrated, systematic, tendency for project appraisers to be overly optimistic about key project parameters. Appraisers tend to overstate benefits and understate timings and costs, both capital and operational. To redress this tendency, appraisers should make explicit allowance for this bias in all Investment Appraisals, regardless of their size or complexity. However, for projects under £1M, submitted from an operational theatre, it is more practical to add a simple percentage of the total cost, based on Optimism Bias. Where specific risk analysis has not been undertaken, explicit adjustments for Optimism Bias must be made to cost estimates in the business case. Table 13.1 shows the percentage uplift that should be applied to the financial estimates. The Optimism Bias percentages³ should then be mitigated depending on the particular project circumstances. The Optimism Bias Mitigation Tables can be found at Annex 13D. It is important to explain on what basis the Optimism Bias figure has been mitigated.

Ser	Project Type	Optimism Bias %
(a)	(b)	(c)
1	Operational Standard Building	51
2	Operational Civil Engineering	44
3	Equipment	200
4	Outsourcing	41

Table 13. 1 – Optimism Bias Percentages

1318. **Foreign currency.** Foreign currency exchange risk is accounted for under the economic factoring in the Optimism Bias tables, and the use of the monthly Foreign Exchange Monitor is a central projection for the US\$–£Sterling and €–£Sterling spot exchange rates looking out for five years. The calculation of Foreign Exchange (FOREX) Rate Risk is included in the PJHQ Financial Model and therefore no action is necessary by the business case

³ Prepared from the results of a study by Mott McDonald, *Review of Large Public Procurement in the UK (2002), into the size and causes of cost and time overruns in past projects.*

author. The use of General Accounting Rates (GAR) in the business case is not to be used. FOREX rates, other than those mentioned above, can be sourced from the Bank of England through the J8 Appraisal and Evaluation Cell, PJHQ.

1319. **Delivery and implementation.** State who, by appointment, is to manage and coordinate the project. If the business case requirement is specifically for the approval of contracted services, include a procurement strategy. Include key dates and project milestones in order to give the reader an idea of the activities and timings that are driving the urgency of the business case.

1320. **Project Evaluation.** Project Evaluation (PE) must always be considered in a business case presented to PJHQ. This is covered in Chapter 12.

1321. **Conclusion.** Summarise the issue, how the selected course of action will address the problem and the consequences of not proceeding with the recommended course of action. Information and analysis that has not previously been referred to should not be introduced. Finish with a firm recommendation of the selected course of action. A summary of points for consideration when producing a business case can be found at Annex 13E.

Annex 13A – Standard business case format



Address

PJHQ

Reference:

Date:

Title of business case

References:

A.

B.

Issue

1. *Short and succinct description of the issue that has generated the requirement. This should be no more than 2 sentences if possible and should set the scene for what is to come.*

Timing

2. **Routine.** Financial approval by... would ensure... *Priority of the work, with a timescale.*¹

¹ If it is a priority, state why.

Recommendation

3. It is recommended that COS(Ops)/CJO approves Course of Action (COA) ... with a Limit of Liability (LoL) of £.....M² for the cost of *project name*.
4. It should be noted that:
 - a. This LoL includes a contingency for risk of £....M, of which £....M is specifically for foreign exchange risk.
 - b. This provides the most robust solution, in an acceptable timeframe, to meet the Minimum Military Requirement (MMR) and is in keeping with ...*plans*.

Background

5. *Provide a background to the project in order to ensure that the reader understands the circumstances that have led to the requirement for this project. All statements are to be factual and, ideally, referenced or footnoted. There should be no mention of the COA or how the requirement can be solved. The background can only be based on historical information. Avoid the overuse of abbreviations and technical jargon – assume that the reader of the business case is an ‘educated layman’ with no prior knowledge of the project or the context in which it is situated.*

Requirement

6. The full requirement is detailed in Reference X, an extract from which can be found at Annex X. In summary, the requirement is:
 - a. XXXXXXXXXXXX.
 - b. XXXXXXXXXXXX.
 - c. XXXXX, etc.

² The Limit of Liability is the project cost plus a contingency for risk, including foreign exchange rate risk. This must be in £Sterling.

Courses of action (COA)

7. The following COA³ have been considered:
 - a. **COA 1 – Title.** *Give a brief description of the COA. Do not analyse the COA and do not explain whether the COA will meet the operational requirement - this will be undertaken in the analysis of the COA. In most circumstances COA 1 will be the 'Do Nothing' option.*
 - b. **COA 2 – Title.**
 - c. **COA 3 – Title.**
 - d. **Etc.**
8. **Assumptions.** The following assumptions have been made:
 - a. XXXXXXXXXXXX.
 - b. XXXXXXXXXXXX.
 - c. XXXXX, etc.
9. **Constraints.** The following constraints apply: *State how they constrain your actions.*
 - a. XXXXXXXXXXXX.
 - b. XXXXXXXXXXXX.
 - c. XXXXX, etc.
10. **Analysis of COA.** The COA have been assessed as follows:
 - a. **COA 1 – Title.** *This should be an objective assessment as to whether this COA meets the operational requirement. Benefits and drawbacks of the COA should be stated, without any mention of the cost. This should all lead to a statement of*

³ List all possible ways the requirement could be solved. Be imaginative. They can be discussed and, if necessary, discounted later in the business case.

whether the COA meets the operational requirement, or not, and if it will be considered further. This COA does/does not meet the operational requirement and is therefore considered/not considered further.

b. **COA 2 – Title.** Assess.

c. **COA 3 – Title.** Assess.

d. **Etc.**

11. **Costs.** The estimated costs have been compiled by *state who*⁴ and are in £M unless otherwise stated. *State what period the costs have been accounted for.*

12. **Investment Appraisal (IA).** The IA output sheets are at Annex X with a graphical representation at Annex X. The results are summarised in Table 1 below at the 50% confidence level. Costs have been assessed at the 1, 3, 5 and 10-year periods.

COA	Year 1 £M	Rank	Year 3 £M	Rank	Year 5 £M	Rank	Year 10 £M	Rank
COA 1								
COA 2								
COA 3								
Etc								

Table 1: IA Summary.

13. **Sensitivity Analysis.** *Sensitivity analysis must be completed. The IA figures in Table 1 are dependent on the assumptions used to construct them. These assumptions are by their very nature inherently uncertain. It is this uncertainty of the assumptions that could affect the ranking of the COA. Sensitivity analysis enables you to look at the circumstances that would give rise to a change in these rankings.*

⁴ For example: UK Works Group.

14. **Selection of COA.** COA X is selected as... *give reasons why the COA has been selected. The reasons should flow logically from the analysis of the COA, the ranking of the COA in the IA table, and the results of sensitivity analysis. Explain how the COA meets the requirement. Do not introduce any new information in this paragraph – the preceding sections of the BC have provided the opportunity to justify the COA.*

15. **Limit of Liability (LoL).** A summary of the project costs for the selected COA, including risk, are shown in Table 2 below. Full details of the costs are at Annex X.

Year	RFML ⁵ £M	Risk & Uncertainty £M	Exchange Rate Risk £M	Total Cost £M
1				
3				
5				
10				

Table 2: Limit of liability for course of action X.

16. **Risk Analysis.** The risk costs have been calculated using the Risk Calculator in the PJHQ Financial Model. The risk costs are summarised in Table 2 above.

Delivery and implementation

17. **Project Management and Coordination.** The project will be managed by XXXXX and coordinated with XXXXX (site authority) and XXXXX (end user) to ensure that the project is run smoothly.

18. **Timings.** The project will be delivered by a XXXXX contract following a competitive tender. All companies tendering for the project will have the appropriate security clearance to conduct this work. The phasing of works is as follows:

⁵ Risk Free Most Likely cost, taken from the LoL Output Sheet.

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- a. **Document Preparation.** Estimated to take X weeks.
- b. **Tender Period.** Estimated to take X weeks.
- c. **Contractor Mobilisation.** Estimated to take X weeks.
- d. **Construction.** Estimated to take X weeks.
- e. **Clear Site.** Clear site and handover to site authorities.

These timelines are for guidance only; further detail will not be available until the winning contractor submits his programme of works. Target completion dates are shown in Table 3 below.

Function	Target Completion Date
Document Preparation	
Tender Period	
Contractor Mobilisation/Resources Delivery	
Construction	
Clear site	

Table 3: Key dates.

19. **Project Evaluation (PE).** A full PE will be produced within 3 months of completion of the project by the Project Sponsor (XXXXXXXX, XXXXX). In addition, monthly progress meetings and reports will ensure that the project is regularly reviewed and any issues will be addressed immediately.

Conclusion

20. This project was developed by a SOR provided by the end user. The Rough Order of Costs (ROC), produced by XXXXXX, has enabled an informed selection of COA to be made. *Describe the benefit of the work. This is your last chance to justify the project to the approver. Give a penalty statement if approval of the BC is not given. Do not introduce new facts or analysis as this is the conclusion. It is recommended that COA X is approved.*

A N Other

Rank

Appointment

Annexes:

- A. Extract from SOR XXXXX (Paragraph XX).
- B. Location schematic and site plan.
- C. Investment Appraisal – Output sheets.
- D. Investment Appraisal – Graphical representation.
- E. Limit-of-Liability – Output sheet.

Annex 13B – Simplified operational business case

Unit Ref:
Infra Task No:

Case details (Note 1)			
Title:			
Source of funds:		Novel/Contentious:	
Will be spent in <36 months:			

Background (Note 2)
Requirement (what?)

Justification (why?)

Courses of action (COA) (Note 3)				
COA 1:				
Advantages:	Disadvantages:			
Either: ruled out because:	Or: cost:		Based on...	
	Contingency:		Based on...	
	L-of-L			

COA 2:					
Advantages:			Disadvantages:		
Either: ruled out because:		Or: cost:		Based on...	
		Contingency:		Based on...	
		L-of-L			
COA 3:					
Advantages:			Disadvantages:		
Either: ruled out because:		Or: cost:		Based on...	
		Contingency:		Based on...	
		L-of-L			

Recommendation (Note 4)					
Selected COA:					
Reason:					
Delivery (how):					
Financial Authority (Holder of Fin Auth)					
Signed		Appointment			
Name		Rank		Date	
Financial concurrence (J8 CivSec Staff)					
Signed		Appointment			
Name		Rank		Date	

Notes:

1. Use a unique reference number and descriptive title; do not change them. These should be linked to the SOR title and number. Confirm that the requirement is not novel or contentious. Seek local J8 advice as required.
2. Describe what the money is needed for using several bullet points. Quote any report or other key Reference. Give the operational justification.
3. Most effort should be spent on the COAs. There must be at least 2 COAs; always consider doing nothing/minimum. Describe the COA in outline. Give an unbiased account of its advantages and disadvantages – bullet points will do. Either rule it out on operational grounds, or cost it. When costing, explain what the base cost and contingency have been based on.
4. State the selected COA and why it was chosen. Say how the project will be delivered; most importantly, who will be the Project Manager. The outline project dates should also be given. The intended maintenance regime should be identified in order to identify any further action. Finally, Financial Authority and Financial Concurrence should be given.
5. Use additional pages if necessary.

Annex 13C – Example of three-point cost estimate

Based on Project Risk Register

No.	Risk	Probability	Impact			Mitigation Strategy	Post-mitigation Residual Risk			Cost Assurance (£k)		
			Time	Cost	Performance		Time	Cost	Performance	Min	Most Likely	Max
	Construction											
1	Variation to fixed price elements of cost – Authority risks, such as shipping, and container rental.	H	L	M	L	Largely un-mitigated.	L	M	L	30	50	70
2	Immature design requires amendment.	H	H	H	L	Every effort made to avoid this; however, rushed pace of delivery makes this inevitable for early stages. However, welfare comms, CT scanner and hospital HVAC solutions are not yet resolved. Internal layouts may alter to accommodate HQ/extra accommodation.	M	M	M	250	500	600

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3	Redesign requires reworking of long-lead items.	L	M	M	L	URD 'closed' and owned by Infra desk.	L	M	L	.	.	100
4	Scale of construction over-matches local suppliers/work force.	M	M	L	M	XXX to use as wide a supplier base as possible, including TCNs.	M	L	M	.	.	150
5	IDF incurs delay and damages equipment.	H	H	H	L	Items well protected and dispersed in COB.	M	M	L	50	100	150
6	Attack on convoy destroys critical long-lead stores item.	L	H	M	L	Use of generic structures allows us to flex material from one to another.	L	L	L	.	100	150
7	Work force may feel too threatened by Sy situation and withdraw hazarding project delivery.	M	H	L	H	May be in part rather than fully. DP on the use of MCF. MCF to be prepared to underwrite delivery, close liaison required. TCN workforce reduces impact of intimidation.	H	L	H	.	.	150
8	Border transport delays.	H	H	H	L	LO to improve convoy coordination.	M	M	L	20	60	80
9	Unknown groundworks problems may delay project.	M	L	M	M	Conduct soil investigation early, agree sites asap.	L	L	L	75	100	200

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Environment												
10	Flooding delays programme causes damage.	H	M	M	L	Raise platforms, use drainage ditch, site away from low sump. Flooding will, however, slow construction as it makes sites less trafficable.	M	M	L		10	50
11	Dust storms make it unsafe to crane or pump concrete.	M	M	M	L	Unmitigated.	M	M	L			10
12	Concreting operations fail in high heat of summer.	H	M	L	L	Hot weather concreting skill to be proved to MDA prior to main pumping on walls and roofs. Contractor risk.	M	L	L			
Financial and Commercial												
13	Contractor delivers early, maximum payment due.	M	H	L	L	Ask for sufficient Fin Auth to cover this cost, not as a contingency.	M	L	L			
14	Security situation impacts project costs e.g. >5 days 'lock-down' causes delays to off-hire of containers and plant.	H	L	M	L	Authority retains risk for serious impacts due to security situation.	L	M	L	100	150	200

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15	Construction inflationary pressures increase, driving up costs.	M	L	M	L	To be considered in commercial proposal. Order in tranches and review price index at time of Contract.	L	L	L	100	200	300
16	Container hire charges increase due to prolonged retention by Th Cont Man.	M	L	M	L	Ensure rapid disposal.	L	M	L		150	250
17	War risk insurance indemnity (DEFCON 661) liability.	H	L	L	L	Residual risk to be factored into Contract. However, loss of key plant through insurgent action will be at Authority risk.	L	M	L	50	150	500
						Total additional sums to reflect project risk				675	1,570	2,960
						Weighting factors.				1/6	4/6	1/6
						Adjusted figures with weighting applied.				113	1,047	493
						Three-point estimate.					1,653	

		£k										
Estimated project cost.	11,740				Based on detailed Wks Gp report.							
Contingency.	1,653				Three-point estimate.							
Limit if Liability Sought	13,393											
Check the value of the contingency as a percentage of the estimated cost.	14.1%				= 1,653 / 11,740							

Annex 13D – Optimism bias table

Mitigation guidance by project type

	Operational standard	Operational Civil Engineering	Equipment	Outsourcing	Examples of contributory factors
Optimism Bias (%)¹	51	44	200	41	
Contributory factors to Optimism Bias (%) ²					
Schedule/procurement risk					
Complexity of contract structure	1		7		Additional negotiation still required. Payment method requires definition. Risk transfer to be defined.
Late contractor involvement	2	3	7		Contractor provided design. Construction feedback resulted in redesign.
Poor contractor capabilities	5		4		Inexperienced contractor. Contractor insufficient resources. Construction not to required standard.
Dispute and claims occurred	11	6			Claims for changes in scope. Disputes over interim payments. Claims for late release of information.
Information management			5		Information not transferred effectively.
Other (specify)		2			Procurement of scarce resources.

¹ Note that these are only indicative starting values for calculating optimism bias contributions because a project's Optimism Bias profile will change during its project life cycle.

² Contributions from each area are expressed as a % of the recorded Optimism Bias. Note: The sum of individual percentage contributions in each column may not add up to 100% due to rounding errors.

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Requirement project specific risks					
Design complexity	3	8	10		Complex ground work for construction. Built in difficult conditions.
Degree of innovation	9	9	17		Unusual site conditions requiring innovative solutions.
Environmental impact		10		7	Impact of threat level on solution. Impact of environment on solution.
Other (specify)	5				
Requirement CJO specific					
Inadequacy of the business case	23	35	18	52	Outputs details not clearly defined. Not all stakeholders involved. Restricted option selection/definition. Requirement likely to change. Complexity of approvals process.
Project Management Team	2	2	5		Inexperienced in delivery of project type. Inadequate review of project plan.
Poor project intelligence	6		4	32	Insufficient ground investigation. Solution based on insufficient information. Requirements immature.
Other (specify)	2				

Financial/Environment risk					
Site characteristics	5	5			Presence of unforeseen site conditions Effect of weather on building schedule. Effect of culture on building schedule.
Permits/consents/approvals	<1				Difficulties in obtaining permissions. Difficulties in prioritising competing requirements.
Other (specify)	3				
Economic	13	3			Change in currency exchange rates. Availability of scarce resources to other nations operating in area.
Legislation/regulations	7	8	5		Health and safety regulatory compliance. Host nation approval.
Technology	1	8	18	9	Sophistication of technology employed. Computer viruses. Limitations of technology employed.
Other (specify)	2	1			

Annex 13E – Points for consideration

Topic	Points for consideration
Justify the requirement	<ul style="list-style-type: none"> • What has generated the need for this expenditure? • What capability gap has been identified? • Express the requirement clearly and concisely. Without a full understanding of the requirement, it is difficult to identify all the possible methods of addressing and meeting the need. • Do not pre-empt the solution. Ensure the requirement is expressed in output-related terms that do not unnecessarily restrict the number of possible options. • Decisions should not be taken before completing the Investment Appraisal.
Set objectives	<ul style="list-style-type: none"> • What are the objectives of the project? • What output is required and when? • A realistic timescale should be chosen depending on the nature and life of the project.
Develop options	<ul style="list-style-type: none"> • Need to consider all possible options for achieving the objectives. • Are there any overriding or binding constraints that reduce the potential for alternative options? • Always include a do nothing option. • Options should not be constrained by cost. • When considering options for contractor delivery, a value for money benchmark must be developed. • There should be no presumption either in favour or against in-house versus contractor provision.

Topic	Points for consideration
Short-list the options	<ul style="list-style-type: none"> • No option should be rejected without properly supported explanations. • The short-list must include the do-nothing option. • Acceptable reasons for rejection include: similar but inferior to another option, technically unfeasible, failure to meet key essential objectives, or operationally unacceptable. • Unacceptable reasons include: discarding on grounds of cost/manpower, or not fully meeting user requirement. • All assumptions should be documented and supported by references.
Assess risk of: - Price volatility - Currency changes - Requirement changes	<ul style="list-style-type: none"> • Key risks should be assessed, evaluated and, if possible, quantified, with particular emphasis on how it is intended to mitigate or manage them. • An Optimism Bias assessment should be undertaken on all options, where appropriate (a justified percentage uplift for the limit-of-liability for risk).
Conclusions: Preferred option Recommendations	<ul style="list-style-type: none"> • Of the options considered, which represents value for money for the Department? • If this is not the recommended route, state the justification. • Should be clear and retained for audit purpose. They will also potentially assist in any Project Evaluation.

Annex A – Insights

‘Be practical and look for solutions, remember *‘Nos es qua nos es’* (We are where we are).’

Anonymous Infrastructure Staff Officer

Chapter 1 insights

A1. This Annex gives a consolidated list of the *insights* identified throughout the document. They represent the distilled key tenets of operational infrastructure.

A2. Insight 1-1 – Both a capability and a line of development.

Operational infrastructure is a line of development in almost all of the military capabilities required on an operation. The ability to deliver and maintain this infrastructure in the operational environment is, however, also a capability in its own right.

A3. Insight 1-2 – Camping-with-equipment. The deployed force must exercise careful control over equipment that may be used both as part of the operational estate and to support units that are merely *camping-with-equipment*.

Chapter 2 insights

A4. Insight 2-1 – The significance of the military works area. A thorough understanding of the implications of a military works area is fundamental to the competent governance of the operational estate and the delivery of infrastructure support:

- a. Military commanders determine the acceptable risk based on the best advice available to them. Risk must not be taken blindly.
- b. Royal Engineers *underwrite* the delivery of operational infrastructure support.

A5. **Insight 2-2 – Application of infrastructure constraints to planning.** Infrastructure constraints and freedoms must be realistically incorporated into all operational plans.

A6. **Insight 2-3 – Think in terms of duration, not degree of permanence.** Unless they are intended to remain as a post-campaign legacy, do not refer to elements of the operational estate as ‘permanent’ or ‘temporary’. Use the terms ‘static’ and ‘enduring’ and describe them in terms of the *period of intended tenure*.

A7. **Insight 2-4 – The need to make decisions.** Decision-making paralysis due to uncertainty over the path and progress of a campaign is the major cause of inefficiency, paucity of protection and wastefulness in the development of the operational estate.

A8. **Insight 2-5 – The need to make good estimates of time.** Good estimates of time are important, especially early in the planning phase. Make sure, however, that those using the estimate are aware of the assumptions made and understand the degree of uncertainty inherent in the stated figures and hence the level of fidelity.

A9. **Insight 2-6 – Do not repeat estimates that have the same inherent fidelity level.** Do not make repeated guess-estimates. Always seek to use a more accurate technique for subsequent estimates. State what work must be done to achieve this.

A10. **Insight 2-7 – The qualities required of infrastructure staff.** Infrastructure staff need to be pragmatic, articulate, resolute, diplomatic and experienced in infrastructure provision.

A11. **Insight 2-8 – Defining success.** Every effort must be made to establish an accurate, unambiguous articulation of the requirement. However, it must be recognised that this will invariably not deliver what that requirement may evolve into. Success should be judged by whether it is *good enough*, not whether it is *optimum*. A degree of expectation management is required.

A12. **Insight 2-9 – State what is required not how to build it.** Express the requirement in terms of *what* effect is required; avoid unduly stipulating *how* it is to be achieved.

A13. **Insight 2-10 – Authority approval.** Any in-theatre, design-stage, critical Authority approval, such as that given by the Fire Officer and Ammunition Technical Officer, should be endorsed/verified by a UK-based authority. It is good practice for the Project Manager to do this especially on large or high-value projects. This mitigates the risk at the handover of an in-theatre successor disagreeing with the original design-stage approval.

A14. **Insight 2-11 – The critical importance of the requirement.** Write the requirement clearly, comprehensively and only once. Then resist the temptation to amend it.

Chapter 3 insights

A15. **Insight 3-1 – Safeguard against a costly tenure.** Make a note of the existing baseline damage and environmental conditions of a location as soon as possible. Obtain a formal agreement to occupy before making any significant investment in infrastructure.

A16. **Insight 3-2 – Changing the names of bases.** Carefully select the name of a base and then do not change it to avoid confusion and maintain traceability.

A17. **Insight 3-3 – Interconnection of infrastructure items.** The physical components of a facility can be used to support more than one function; a tent can be used for accommodation, or as a hospital, headquarters or workshop; the metal planks with a length of trackway are the same as those in an airfield repair mat.

A18. **Insight 3-4 – Always plan for protection.** Threat levels can go up and down repeatedly. They change far more rapidly than infrastructure can be adapted. Therefore physical protection, and its upgrade, must be planned for at the outset.

A19. **Insight 3-5 – Always plan for expansion.** A lack of provision for adequate expansion room can often compromise physical protection.

Chapter 4 insights

A20. **Insight 4-1 – The impracticability of applying through life management.** Care must be taken not to waste time developing overly complex Through Life Management plans as the Whole Life Cost of infrastructure is impossible to predict with any reasonable fidelity until the duration of an operation is certain.

A21. **Insight 4-2 – Determine how and who will address the non-infrastructure lines-of-development.** The non-infrastructure lines of development must be addressed in order to produce a functioning capability. The infrastructure staff, by themselves, cannot deliver them.

A22. **Insight 4-3 – The need for a Project Manager to take the project to handover.** Be clear who the Project Manager is and what they are responsible for. Someone must be responsible for ensuring that the project is ready to hand over.

A23. **Insight 4B-1 – A written handover certificate is in everyone's interest.** Ensuring that a handover certificate is issued makes a clean break between constructor and maintainer. A written record of what was agreed is essential as the resolution of outstanding issues often takes considerable time.

Chapter 5 insights

A24. **Insight 5-1 – Always plan for maintenance.** Nothing should ever be constructed without careful consideration and a clear plan for how it will be maintained.

Chapter 6 insights

A25. **Insight 6-1 – Appreciate the commercial pressures on a contractor.** Contractors must make money. If it is unprofitable to do so, they may withdraw and leave the military to undertake the work. The establishment *and maintenance* of a wide pool of contractors keeps costs down, reduces operational risks and gives flexibility to the methods of delivery. It is therefore better to be cooperative rather than adversarial when exercising the contract; seeking partnership and consensus. By being a good client, we are able to retain contractors even when it may be more profitable for them to work for others who may pay more.

A26. **Insight 6-2 – Be an intelligent customer when deployed.** This requires experienced personnel in theatre, who understand the needs of the operation and the infrastructure products and services that are required.

A27. **Insight 6-3 – Give contract instructions, not orders to a contractor.** Contractors are not given orders through a chain of command in the same sense as that which applies to military personnel. Contractors are given contract instructions. These must be valid instructions under the terms of the contract and may incur a cost. Therefore they must be given through the authorised Contract Sponsor.

A28. **Insight 6-4 – The need for contract monitoring.** Contracts do not run themselves. Some form of deployable Authority structure is required. Deployed personnel must be familiar with the form and function of the contracts used (for example, contract-competent). This requires both training and experience that should ideally be gained away from the operational environment; on-the-job training does not safeguard operational success.

A29. **Insight 6-5 – Contractors should not be used to monitor contracts on behalf of the Authority.** Experience has shown that in disputes between the contractor and the company acting on our behalf, the only thing they can agree on is that the Authority should pay more. Without having any of its own staff able to control the contract, the MOD ends up paying more. The responsibility to the taxpayer cannot be outsourced.

A30. **Insight 6-6 – Contract management.** There should be expert and dedicated contract management for the term of the contract.

A31. **Insight 6-7 – Separation of Financial and Commercial Authority.** Financial and Commercial Authority should not be vested in the same person. Ideally, neither of these should also be given to someone and his direct subordinate.

A32. **Insight 6-8 – Specific contracts.** Some companies have more than one contract with the MOD. It is important to understand through which specific contract, any action is being sought. This is because the Terms and Conditions and payment mechanisms may vary from contract to contract.

A33. **Insight 6-9 – No sub-delegation of commercial authority.** The commercial authority held by Works Contract Officers cannot be sub-delegated. Whilst Supervising Officers can work on their behalf, the Works Contract Officers retain commercial authority and responsibility.

A34. **Insight 6-10 – Penalty clauses.** Penalty clauses are not enforceable under English Common Law and therefore cannot feature in MOD contracts. However, under-performance against contractual deliverables may be remedied through withholding payment. Evidence will be needed, hence the requirement for authority monitoring throughout. In an inadequately supervised contract it is impossible to safeguard value for money.

A35. **Insight 6-11 – Clarify the payment process as part of the contract strategy.** When planning a contract, determine beforehand:

- a. Who has the authority and ability to check that the work/services are in accordance with the contract and hence give technical authorisation for payment.
- b. Who has the authority to release funds (for example, Financial Authorisation) for payment.
- c. Who monitors spending against the authorised budget.

Chapter 7 insights

A36. **Insight 7-1 – The tenets of military infrastructure support.** The tenets of military infrastructure support are:

- a. REs underwrite delivery of infrastructure support.
- b. Design, resource, construct and maintain.
- c. Enable the deployed force to be an intelligent customer.

A37. **Insight 7-2 – Capability can exist without equipment.** Knowledge is the lightest and most rapidly deployed capability. Even without any equipment, it is possible for the UK Armed Forces to obtain infrastructure support through the contracting and engineering skills of its military engineers.

A38. **Insight 7-3 – The delivery of infrastructure support should be coordinated by the Joint Force Engineer.** Howsoever infrastructure support is provided, efficient coordination is only possible across the force, through the Joint Force Engineer.

A39. **Insight 7-4 – The risk of contractors refusing to operate in non-benign areas.** Contractors are most cautious and unpredictable when they do not have a clear understanding of the threat to their people – not when it is hazardous but the risks are well understood. Therefore the most difficult times for a contractor are during early entry to a new theatre and when the operational threat is rapidly changing.

Chapter 8 insights

A40. **Insight 8-1 – Make sure items are on the Asset Register.** If it is not on the Asset Register it probably is not *on the radar* for safety inspections.

A41. **Insight 8-2 – Do not use the *entrusted stock*.** Seek PJHQ's authority before using entrusted stock for anything other than facilities management.

A42. **Insight 8-3 – Use the approved process for obtaining masts and towers.** Unless a mast has been manufactured and erected by a DIO-approved contractor, it is never likely to be given a ‘safe-to-climb’ certificate.

A43. **Insight 8-4 – Self-help work.** Experience has shown that ‘self-help’ work often falls far short of acceptable electrical, fire, and other safety standards. While there is undoubtedly a place for it on the operational estate, the risks associated with it must be very carefully managed.

A44. **Insight 8B-1 – Capture the full cost of the Infrastructure Support Provider contract.** PJHQ needs to know how much is spent on the Infrastructure Support Provider contract. In order to do this, theatre must inform PJHQ how much of its financial delegation it exercises over the contract.

Chapter 9 insights

A45. **Insight 9-1 – Ownership of Joint facilities.** When sharing support arrangements with a coalition partner, the formal agreement should stipulate who actually owns the infrastructure. If it is held ‘in common’, arrangements should be made for if one party decides to withdraw from the operation.

A46. **Insight 9-2 – Use the existing Memorandum of Understanding.** If an existing Memorandum of Understanding (MOU)/Technical Agreement (TA) is failing and does not deliver the infrastructure support that is sought, it is better to pursue remedies through that MOU/TA rather than seek to create a parallel UK estate. This only adds to confusion over responsibilities in the host’s bases and reduces *value for money*.

Chapter 10 insights

A47. **Insight 10-1 – Reasonably practicable.** Determining *reasonably practicable* is not about establishing an even balance between the costs and benefits of measures. It is about adopting measures except where they are ruled out because they involve grossly disproportionate sacrifices.

A48. **Insight 10-2 – Competence.** Competence involves much more than technical training. It includes attitude, behaviour, judgement as well as current experience and knowledge of the application domain.

A49. **Insight 10-3 – The principled disapplication of the rules.** If derogations from policy/regulations are planned, they should be tested against the principles set out in this Joint Tactics, Techniques and Procedures (JTTP).

A50. **Insight 10-4 – Inheriting other people’s safety standards.** Commanders will invariably inherit an operational estate which has been developed on the basis of subjective, risk-taking decisions made by their predecessors. They will have little choice (at least initially) but to accept this. They should seek to change anything with which they feel uncomfortable, or *record* why they did not. What matters is their assessment of what is reasonably practicable.

A51. **Insight 10-5 – Do not be caught out by the passage of time.** Even if safety and operational risks remain the same, the passage of time may mean that what was once reasonably practicable may no longer be so. This may occur in cases for which there may have been no cause to revisit the original problem. It is important therefore to know where safety derogations have been made and to keep the associated risks under review. In particular, follow-on commanders must be made aware of the possible need to review decisions made by their predecessors.

A52. **Insight 10-6 – Focus on the most significant safety risks.** It is reasonably practicable to invest the limited overall time available in focusing on key risks sufficiently, whilst not ignoring all risks completely.

A53. **Insight 10-7 – Using standard design templates.** Even if you chose to use a standard design template, the act of choosing to apply that solution makes you a ‘designer’.

A54. **Insight 10-8 – On-site modification.** If you make on-site modifications to designs then you also become a ‘designer’.

Chapter 11 insights

A55. **Insight 11-1 – Environmental stewardship.** Environmental stewardship is about preserving human health, looking after the land with which we have been entrusted, safeguarding British military reputation and limiting our future liability for claims well beyond the end of an the operation.

Chapter 12 insights

A56. **Insight 12-1 – The importance of a good working relationships.** For members of the Infrastructure Staff to be successful, they must have a close and effective working relationship with the J8 Financial Staff in their headquarters.

A57. **Insight 12-2 – Funding.** Understand from the outset how a project will be funded. It influences what may be authorised and how it may be delivered.

A58. **Insight 12-3 – Non-UK beneficiaries.** If a project benefits any non-UK military organisation, ensure that funding arrangements are resolved first; otherwise the business case may be delayed.

A59. **Insight 12-4 – Plan for enough time to process the business case.** The time required to process a business case to obtain financial approval, must to taken into account during planning.

A60. **Insight 12-5 – Business case planning.** Business cases should not be prepared against possible courses of action solely to avoid delay. It should be: concept of operations, then plan, then business case – not the other way round.

A61. **Insight 12-6 – Avoid a personally expensive mistake.** It is forbidden to enter into a contract without financial approval.

Chapter 13 insights

A62. **Insight 13-1 – Do not prejudge the outcome on an Investment Appraisal.** It is important that an Investment Appraisal is carried out in an open-minded and objective manner and is not used to support a decision that has already been made.

A63. **Insight 13-2 – Discuss the production of a business case with PJHQ before starting work on it.** The most common mistake is to spend an unnecessary amount of time drafting a business case, which is then sent for the first time to Permanent Joint Headquarters (PJHQ) with a request for financial approval. Invariably, this prompts a number of supplementary questions from PJHQ, resulting in frustration in theatre. Before starting a business case, contact the theatre Civil Secretary (CivSec) staff or PJHQ J8 and discuss the requirement, course of action and supporting information that will be expected. This will avoid wasting time later.

Lexicon

Part 1 – Glossary of terms

accommodation tiers

The three different generic types of accommodation expressed in capability terms.

asset register

The list of all infrastructure assets that are the responsibility of the Facilities Management.

assistant supervising officer

A skilled artisan employed to support a Supervising Officer.

battlefield infrastructure

Infrastructure required for the direct support of combat.

beneficial occupancy

The occupation of a facility (in whole or in part) by the user before formal handover.

campaign infrastructure

All non-battlefield infrastructure required in the operational estate.

camping-with-equipment

Using equipment infrastructure whilst manoeuvring outwith the operational estate.

combat support engineering

Direct engineering support to current or imminent operations.

commercial authority

The formally sanctioned ability to enter into a contract for goods and services.

communications infrastructure

Examples include: masts, server rooms, pits and ducts, and radomes.

compartmentalisation

The internal division of a structure or facility using protective walls in order to reduce the number of casualties in the event of an attack.

defects liability period

The period beyond the formal completion of work during which a contractor remains liable for and defects found in the facility.

defence lands agent

The person in Defence Infrastructure Organisation authorised to enter into leases, sub-leases, and licences in the name of the Secretary of State for Defence.

deployable works commercial toolkit

A prepared set of template contract, formal letters and other standard forms, used by Works Contract Officers.

domestic accommodation

Examples include: sleeping accommodation, kitchens and dining facilities, ablutions, laundry, gymnasium, welfare, unit stores, and administrative facilities.

entrusted stock

Items in the supply chain but held by the Facilities Management contract in readiness for incorporation into the operational estate as part of the repair and maintenance process.

equipment support

Equipment repair and maintenance.

estate management

The inspection, servicing, repair and life cycle replacement of infrastructure. This includes the financial management of these activities and their improvement.

expeditionary infrastructure

The additional infrastructure required by the Force and augmenting any indigenous infrastructure.

facilities management

Integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities.

financial approval

The formal permission to spend money up to a limit-of-liability as granted by someone with delegated Financial Authority.

financial authority

The formally sanctioned ability to spend money.

financial concurrence

The endorsement by a Financial Officer that is required before financial approval may be given.

force protection engineering

The infrastructure work that is undertaken to protect a deployed Force.

force support engineering

The deliberate, longer-term work to sustain the Force, prepare for future operations and to prosecute the mission.

hard facilities management

The Facilities Management activities associated with infrastructure support; maintaining and repairing structures, water treatment, power generation etc.

hybrid infrastructure

A mixture of indigenous, constructed and equipment infrastructure.

inclusive repair limit

The maximum cost of individual repairs (inclusive of all labour materials and plant) which a Facilities Maintenance contractor has included within their firm price for the contract.

indicative proposal

A quick, but inaccurate estimate made by a contractor; it is not contractually binding.

indigenous infrastructure

The infrastructure within the joint operations area (hostile and/or host nation) that has been provided for the use of the local population.

infrastructure

The basic physical structures (for example, buildings, roads, and power supplies) needed for the operation of a society or enterprise.

infrastructure development plan

A site-specific plan that details how the infrastructure will be developed, identifying resources and timescales.

infrastructure engineering

The ability to deploy, construct, maintain and repair infrastructure through engineering.

infrastructure programme

An operational-level perspective of the development of the estate showing the inter-relation of project

infrastructure support provider contract

The contract through which Facilities Management is procured.

invitation to tender

The request for commercial proposals from a contractor for goods or services.

lands officer

A suitably qualified and experienced person authorised by the Defence Lands Agent to undertake lease negotiations on his behalf.

letter of intent

A holding letter issued after financial approval has been given, but before contract documentation has been prepared.

limit-of-liability

The financially approved budget for a project.

liquidated damages

The financial cost of late delivery of a facility.

locally employed civilian

A local employed directly by the MOD.

locally recruited workers

A local employed by a contractor engaged by the MOD.

main base

A large, complex, static location whose position is determined by strategic or operational considerations such as Theatre Entry, campaign support and air operations. It is likely to have a large contingents of allied forces and non-military organisations.

milestone payment schedule

The pre-agreed staged payment to a contractor for the delivery of discrete packages of work.

military construction force

The military body trained to provide infrastructure support.

military design authority

The military body with authority to establish design standards and assess compliance with those standards.

military works area

A specifically designated geographic area in which, for operational reasons, compliance with the full suite of UK health and safety standards may not be practical - risk is therefore taken.

minimum military requirement

A standard of scope, construction and finish that meets both the statutory and military requirements without unnecessary aesthetic or quality enhancements. It is meant to ensure a robust form of construction to provide the lowest whole life costs. This may mean that more expensive, high quality materials are appropriate to provide the best overall value for money.

operational estate

The operational infrastructure for which a UK force is responsible for providing and supporting.

operational infrastructure

The basic physical structures (for example, buildings, roads, and power supplies) within the joint operations area upon which the Force relies for the prosecution of its mission through the sustainment and exercise of deployed military capability.

optimism bias

The tendency for project appraisers to be overly optimistic about key project parameters such as cost and delivery date.

programme management

The coordination, direction and oversight of the implementation of a set of related projects and activities in order to deliver outcomes and benefits related to an organisation's strategic objectives.

project management

The process of planning, organising, securing and managing resources to bring about the successful completion of specific project goals and objectives.

refresh

A largely cosmetic refurbishment of a camp conducted in-situ (Level 3 maintenance).

regeneration

A major overhaul of a camp that cannot be undertaken whilst the camp is occupied (Level 4 maintenance).

remediation

The work to repair and reinstate a site to its former condition.

rough order magnitude 10 or 20

An indicative commercial proposal where cost is estimated to be with 10 or 20%.

soft facilities management

The Facilities Management activities that are considered to be 'services', such as, laundry, catering, and cleaning.

staff estimate

A quick, but inaccurate deterministic estimate by the staff.

statement of requirement/need

A clear articulation of what is needed.

supervising officer

A contract-competent person responsible to a Works Contract Officer for monitoring contractor performance.

tactical base

A static location whose position is primarily influenced by tactical considerations such as the need to dominate key terrain, vital ground or provide logistic support to combat operations.

technical accommodation

Examples include: workshops, storage facilities, and large open-plan special-purpose structures.

tender

A potentially binding offer to undertake work for a given price.

theatre infrastructure development directive

PJHQ's directive to the deployed Force that sets out the strategic plan for the development of the operational estate, giving overall priorities and setting critical standards.

third country national

A person employed by a contractor, who is neither from the UK nor the host nation.

value for money

The optimal combination of economy, efficiency and effectiveness.

variation order

A priced instruction to alter the original provisions of a contract.

works contract officer

A military officer with a commercial licence permitting the procurement of infrastructure.

PART 2 – LIST OF ABBREVIATIONS

170 Engr Gp	170 Engineer Group
ACHE	Aircraft Handling Equipment
ACSA	Acquisition and Cross-Servicing Arrangement
AE	Authorising Engineer
AESP	Army Equipment Support Publication
AOS	Aircraft Operating Surface
AP	Authorised Person
ARB	Additional Resource Bid
ASO	Assistant Supervising Officer
BC	Business Case
BSA	Beach Support Area
BXP	Border Crossing Point
CAA&I	Competent Army Authority and Inspectorate
CAS	Cost Assurance Section
CDM	Construction (Design and Management) Regulations
CIWG	Capability Integration Working Group
COA	Courses of Action
CofW	Clerk of Works
CONLOG	CONtractor LOGistics
CP	Checkpoint
CR	Collective Responsibility
CS	Communications Site
DCF	Discounted Cash Flow
DIO	Defence Infrastructure Organisation
DWCT	Deployable Works Commercial Toolkit
E&LSC	Engineer and Logistic Staff Corps
EBS	Environmental Baseline Survey
EC	Equipment Capability
EC	Embedded Camp
ECP	Entry Control Point

Lexicon

ECR	Environmental Condition Report
EinC(A)	Engineer-in-Chief (Army)
ELMG	Environmental Liability Management Group
ERMC	Engineer Resources Management Cell
ES	Equipment Support
FARP	Forward Arming and Refuelling Point
FB	Fire Base
FLS	Forward Logistics Site
FM	Facilities Management
FMR	Forward Maintenance Register
FOB	Forward Operating Base
FOC	Full/Final Operating Capability
FSU	Forward Support Unit
GE	Garrison Engineer
HBN	Health Building Notes
HN	Host Nation
HTM	Health Technical Memoranda
IA	Investment Appraisal
IDF	Indirect Fire
IDP	Infrastructure Development Plan
IMPS	Infrastructure Management Policy Statement
Infra	Infrastructure
IOC	Initial Operating Capability
IRL	Inclusive Repair Limit
ISP	Infrastructure Support Provider
ITC	Improved Tented Camp
ITT	Invitation to Tender
JFEngr	Joint Force Engineer
JSC	Joint Support Chain
KPI	Key Performance Indicator
KUR	Key User Requirement

LEC	Locally Employed Civilian
LoL	Limit-of-Liability
LQA	Land Quality Assessment
LRW	Locally Recruited Worker
MAC	Multi-activity Contract
MCF	Military Construction Force
MDA	Military Design Authority
MITL	Maritime Intra Theatre Lift
MLSA	Mutual Logistic Support Arrangement
MMR	Minimum Military Requirement
MOU	Memorandum of Understanding
MPS	Milestone Payment Schedule
MSR	Main Supply Route
MWA	Military Works Area
NACMO	Non Attributable Cost of Military Operations
NAMSA	NATO Maintenance and Supply Agency
NPV	Net Present Value
NSE	National Support Element
NSIP	NATO Security Investment Programme
O&M	Operation and Maintenance
OGC	Office of Government Commerce
OGD	Other Government Department
OIRR	Operational Infrastructure Recce Report
OP	Observation Post
PAC	Port Agency Contract
PB	Patrol Base
PE	Project Evaluation
PMP	Planned Maintenance Programme
POS	Post-occupation Survey
PQE	Professionally Qualified Engineer
PTS	Professional and Technical Services

Lexicon

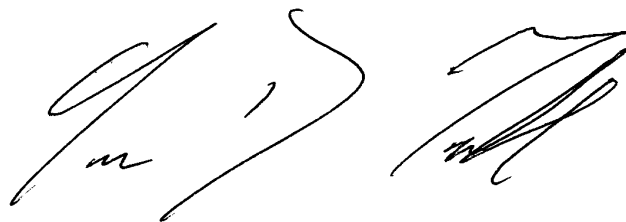
ROC	Rough Order Costs
ROM	Rough Order Magnitude
SI	Site Instructions
SME	Subject Matter Expert
SO	Supervising Officer
SOR	Statement of Requirement
SofS	Secretary of State
SRB	Safety Rule Book
SRO	Senior Responsible Owner
SRPs	Safety Rules and Procedures
SSoW	Safe System of Work
STRE	Specialist Team Royal Engineers
TA	Technical Agreement
TCN	Third Country National
TCQ	Time Cost Quality
TDA	Temporary Deployable Accommodation
TDO	Theatre Designated Officer
TIDD	Theatre Infrastructure Development Directive
UKN	UK National
VfM	Value for Money
VO	Variation Order
WCO	Works Contract Officer
Wks Gp	Works Group

JOINT TACTICS, TECHNIQUES AND PROCEDURES 4-05.1

(2nd Edition)

COMPENDIUM OF EQUIPMENT INFRASTRUCTURE

Joint Tactics, Techniques and Procedures 4-05.1 (JTTP 4-05.1) (2nd Edition),
dated November 2012,
is promulgated
as directed by the Chiefs of Staff



Head of Doctrine, Air and Space (Developments, Concepts and Doctrine)

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Record of amendments

Amendment no.	Date of amendment	Initials

Preface

1. Joint Tactics, Techniques and Procedures (JTTP) 4-05 *Operational Infrastructure*, was first published in 2001. Unfortunately none of the planned supporting sub-documents were subsequently published.

Purpose

2. The purpose of this sub-document to JTTP 4-05 is to give the detailed information required to plan for, and obtain, equipment infrastructure to support the operational estate. JTTP 4-05.1 *Compendium of Equipment Infrastructure* is one of several sub-documents that deal with specialist topics in the planning and delivery of infrastructure support on operations.

Scope

3. Extensive reference is made to JTTP 4-05 and it should be read alongside this sub-document. JTTP 4-05.1 provides detailed advice on:

- a. Obtaining infrastructure – related items through the Joint Supply Chain.
- b. The capabilities of items of equipment infrastructure and associated key planning information.

Target audience

4. This publication is aimed at providing the guidance required by personnel responsible for:

- a. The planning of infrastructure support to operations.
- b. The delivery of infrastructure support in theatre.

Compendium of Equipment Infrastructure

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Lexicon

Chapter 1 – Equipment infrastructure

Section 1 – Obtaining equipment

101. **Equipment infrastructure.** Chapter 3 of Joint Tactics, Techniques and Procedures (JTTP) 4-05 *Operational Infrastructure* explains how equipment infrastructure is incorporated into the operational estate. It outlines how equipment and materiel can be obtained through the Joint Support Chain (JSC).

102. **Release to theatre.** JTTP 4-05 also explains how equipment may be authorised for release to theatre.

103. **Operational Demand Process.** The detailed operational demand process is complex. A simplified series of flow charts is provided at Annex 1A. Often the full commercial process must be followed in order to obtain items through the Joint Supply Chain, materiel in particular. This can take a considerable length of time. Ordering is simplified if items are codified, for example, they are given a NATO Stock Number (NSN). Codified equipment and materiel is readily ordered through Stores System 3. The charts at Annex 1A include comments and advice for those who plan and manage the operational estate, in particular infrastructure Project Managers.

104. **Costing Projects.** As explained in Chapter 12 of JTTP 4-05, and shown in Annex 1A here, the cost of items obtained through the Joint Supply Chain may be hidden from those preparing the courses of action in an Investment Appraisal. The base Logistic Information System (Log IS) can only give the price paid to purchase the current items,¹ not their replacement cost.

Section 2 – Functional categories

105. **Equipment taxonomy.** Chapter 1 of JTTP 4-05 sets out an equipment taxonomy. The subsequent chapters of JTTP 4-05.1 detail equipment infrastructure organised by the functional categories within that taxonomy.

¹ If the cost is actually recorded.

106. **Bridging and operating surfaces.** This JTTP only lists those bridging and operating surfaces that are not associated with a vehicle, such as the bridges laid under armour. The items listed here are of two types:

- a. Operating surfaces (domestic trackway, hardstanding for storage/repair, air, aviation and UAV operating surfaces).
- b. Gap crossing equipment (bridges, ferries and associated trackway).

107. **Protective structures.** Protective structures are either standalone elements or integrated components of other facilities. They are planned and built through Force Protection Engineering. Currently none of the items supplied through the Joint Supply Chain are considered to be 'equipment'. They are not held against a liability and are considered to be consumable stock. Nevertheless, many key components are reusable and so those elements should be recovered and returned to the Equipment Manager.

108. **Domestic accommodation.** Domestic accommodation equipment may be intended both for unit-organic and centralised use, for example, tentage, camp facilities such as laundry, ablutions, kitchens, and waste incinerators. This includes utilities, such as power generation, that are integral to these facilities.

109. **Technical accommodation.** Technical accommodation equipment enables command and control, Equipment Support (inspection and maintenance), materiel storage and processing, and other specialist functions. This includes mobile headquarters, offices, workshops, aircraft shelters, detention facilities, and passenger handling.

110. **Medical facilities.** Medical facilities are field hospitals, aeromed facilities and mortuaries, primary health care, and field surgical facilities.

111. **Communications infrastructure.** Communications Infrastructure includes masts, TEMPEST facilities, and other physical infrastructure required to facilitate communications and Communication and Information Systems (CIS). Currently there is no centralised equipment infrastructure in this category.

112. **Utilities: power, water, fuel, and waste.** As categorised in this JTTP, utility equipment systems are those not specifically designed to be integral and embedded within a domestic or technical facility. This therefore includes, for example, towed generators, power distribution systems, water treatment and storage, bottling plant, fuel handling, and lighting trailers.

Annex 1A – Operational demand procedure

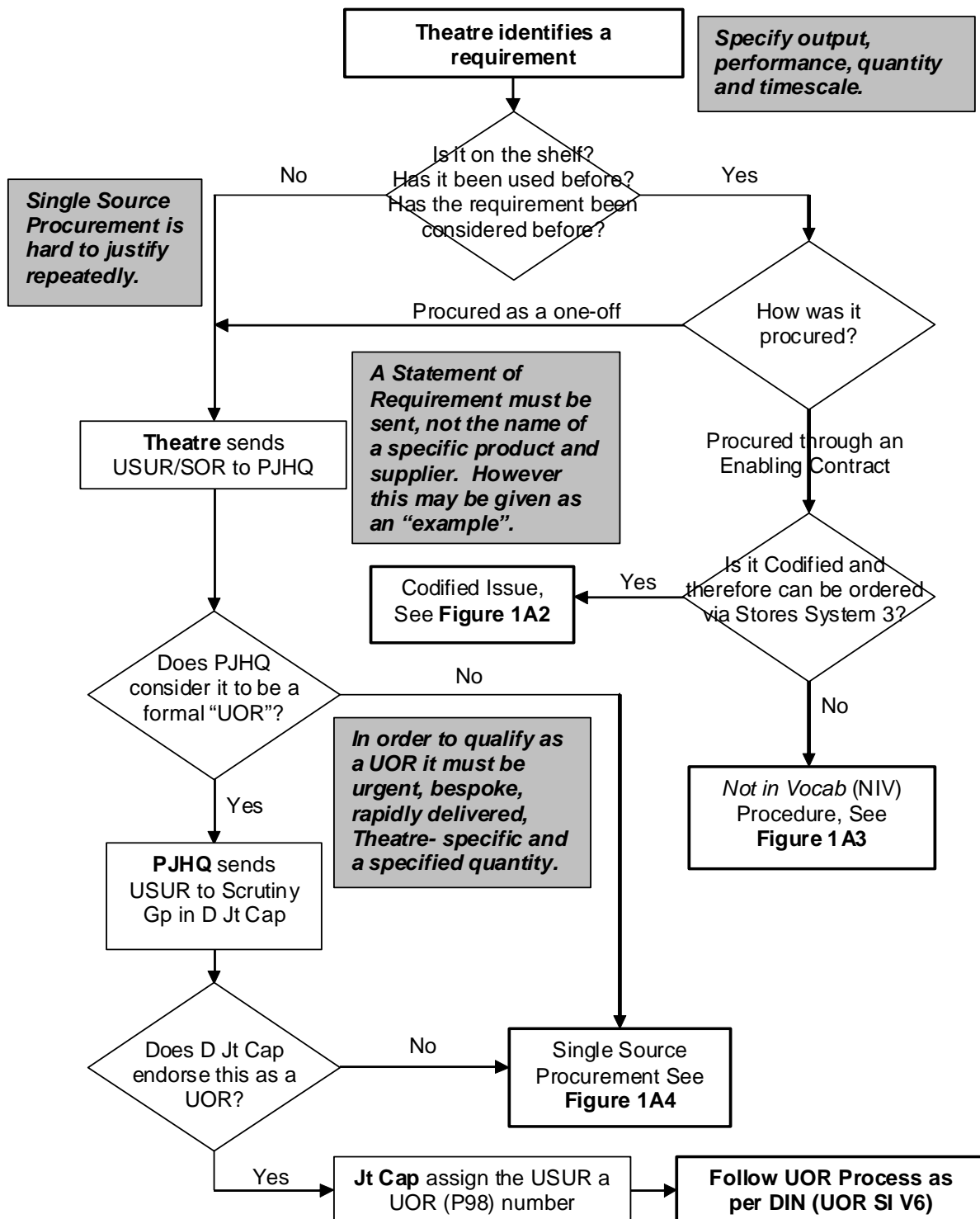


Figure 1A.1 – Operational demand process

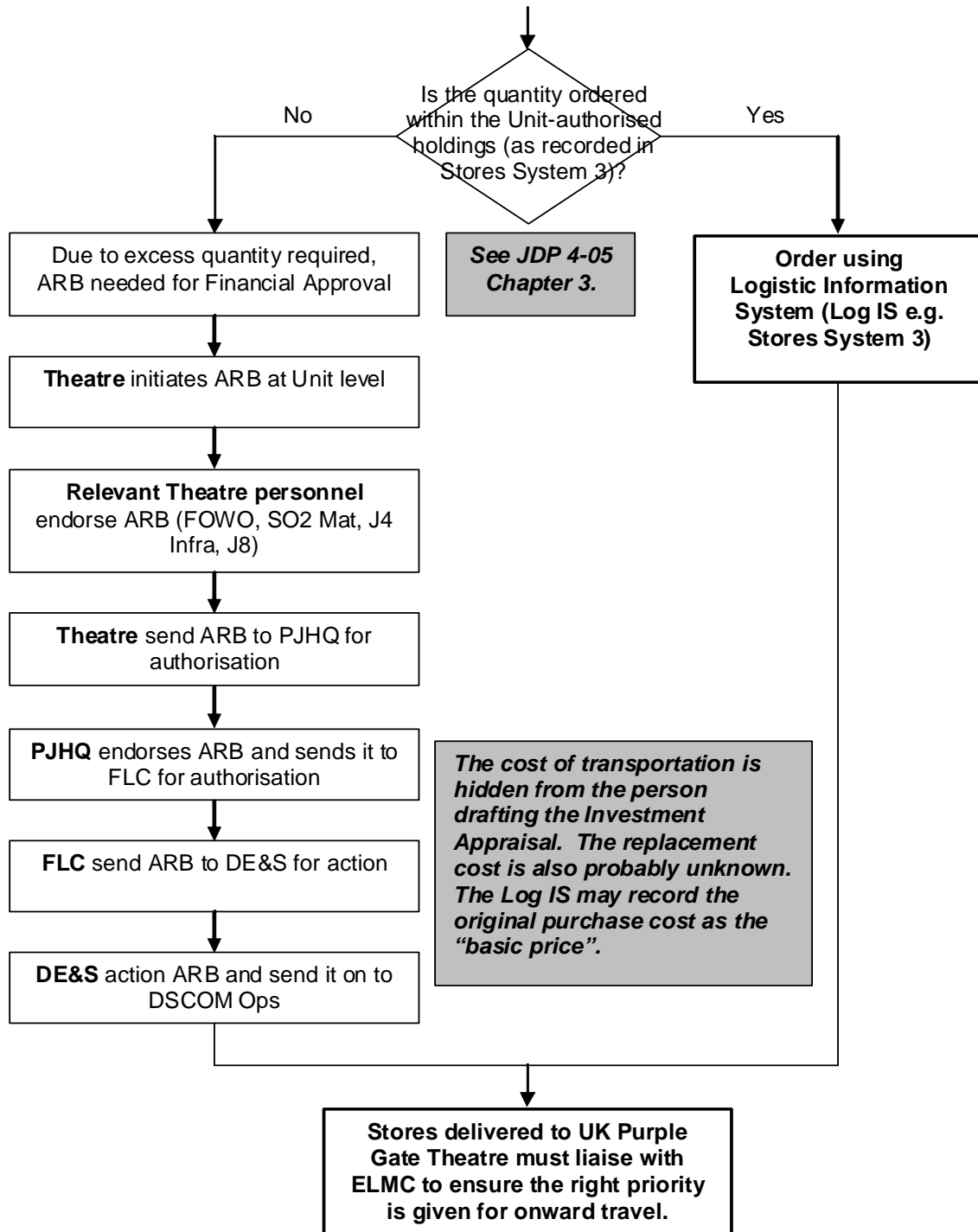


Figure 1A.2 – Codified issue

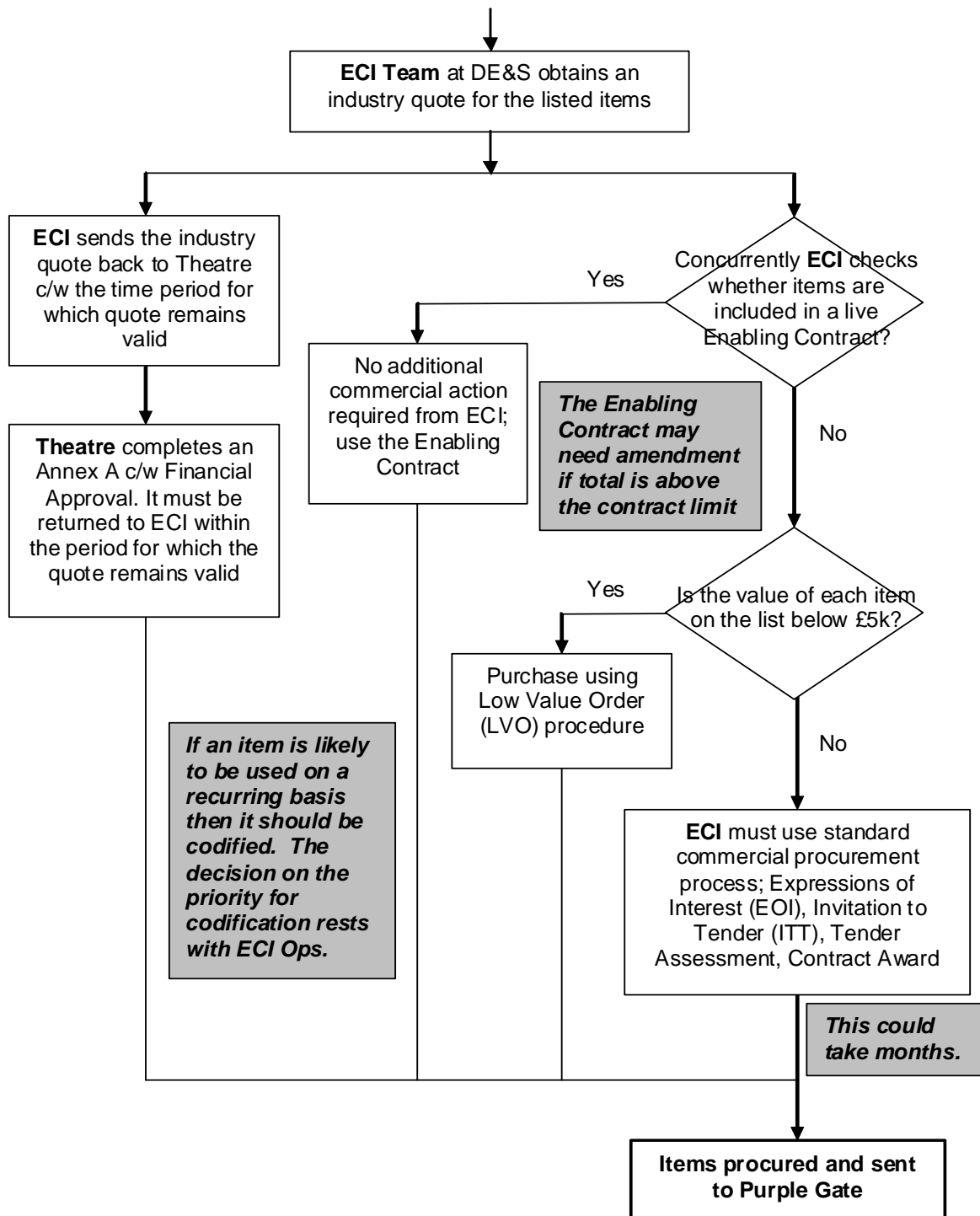


Figure 1A.3 – *Not in Vocab (NIV) procedure*²

² Non-codified, *Not-in-Vocab*, items are ordered using Annex A to *Engineer Logistics Policy Statement (ELPS) No.2*. The person with the appropriate Financial Approval must sign the form.

Proving a COTS/MOTS solution can be identified, this rapid procurement process is followed. If one cannot be identified then the normal, competed process is used.

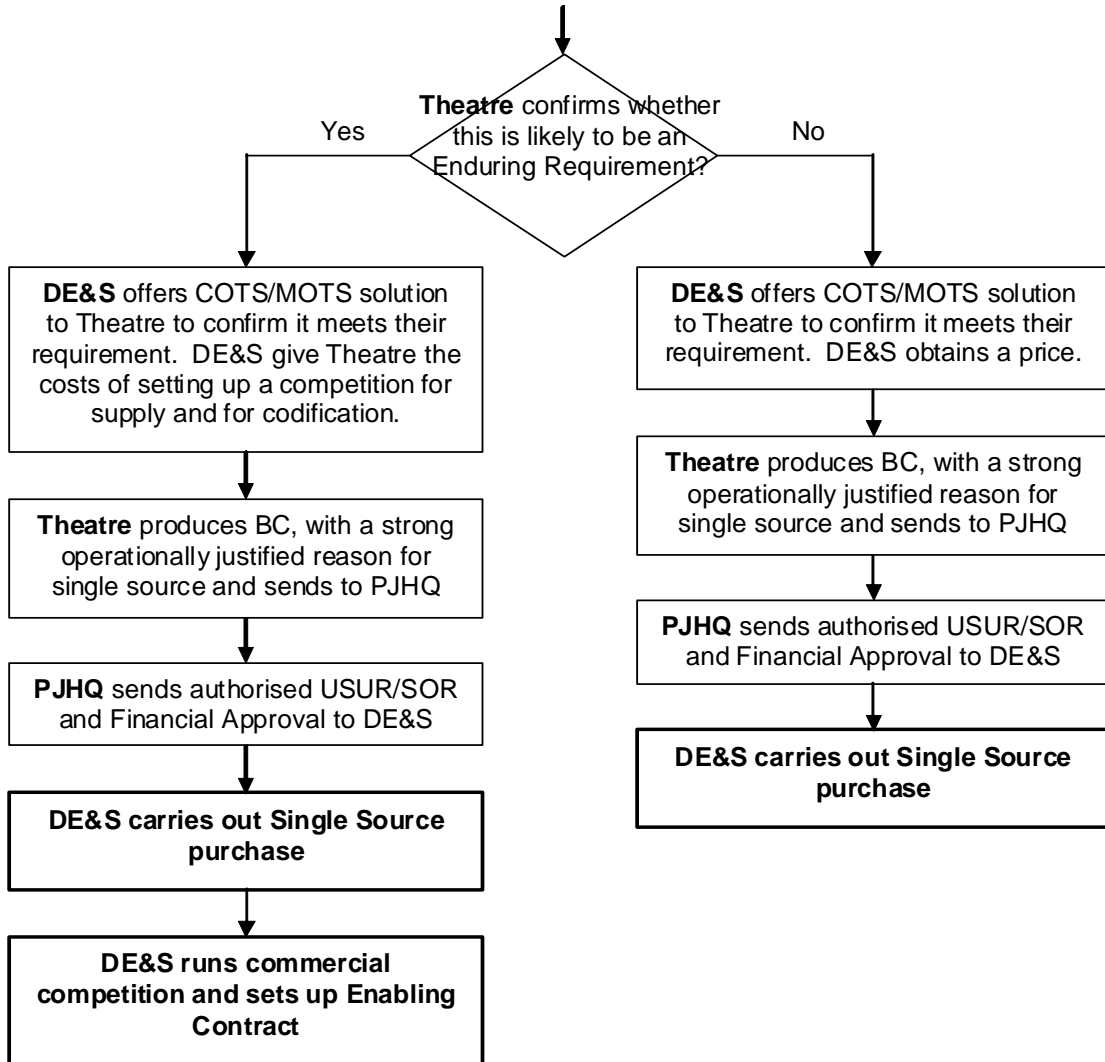


Figure 1A.4 – Single source procurement

Chapter 2 – Bridges and operating surfaces

Section 1 – Logistic Support Bridge

201. **Description and purpose.** The Logistic Support Bridge (LSB) is a through-deck bridge for one-way traffic. LSB is deployed along lines of communication, and main deployment and supply routes to provide or replace bridges, or to upgrade routes for heavier traffic. A standard LSB can be built as a single-span bridge from 15 m up to 39 m. It has a Military Load Classification (MLC) of 80(T) for tracked vehicles and 110(W) for wheeled vehicles.



Figure 2.1 – Logistic Support Bridge

202. **Constituent parts.** It can be supplied as a configured item in a number of 'sets'. The *long-span set* can be used with two *standard sets* to make a single-span bridge from 39 m up to 61 m. A *launching set* is provided for building and recovering the bridge. Pier sets are used to cross long gaps using two or more standard LSBs.

203. **Size and transportation.** Bridges' sets are normally flat-racked. A 39 m standard LSB takes up 11 flat racks. A 50 m bridge comprising the long span set and two standard sets takes up 24 flat racks.

204. **Construction and assembly.** A Terex AC 35 Capacity 30 T (or equivalent) crane is required for construction.

205. **Other Planning Considerations.** This bridge has a shallow approach section making it readily trafficable by civilian goods vehicles. However, if it is to be routinely trafficked by civilian vehicles it is best set slightly sunk into its abutments to bring the bridge deck flush with the road. This greatly increases the overall construction time from that normally quoted. Bridge abutment and road alignment work should always be factored into the overall construction project. Unattended equipment bridges are vulnerable to theft. Given its overall size, the LSB is more susceptible to theft of its components rather than theft of the entire bridge.

206. **Ordering information.**

a. **Equipment Manager.** Manoeuvre Support Project Team (MS PT).

b. **NSN.**

LSB Bridge	5420-99-808-5796
Long Span Set	5420-99-808-5802
Launching Set	5420-99 908-5797
Span junction Set	5420-99-908-5799
Distribution Beam set	5420-99-908-5800
Footwalk	5420-99-908-5801
Ramp Set	5420-99-908-5798
Fixed Pier Set	5420-99-908-6191

Section 2 – Medium Girder Over Bridge

207. **Description and purpose.** Medium Girder Over Bridge (MGOB) is used to increase the loading capability of normal bridges or to strengthen weakened bridges and sections of road. It is used as a follow-up to armoured vehicle launched bridges or on re-supply routes. It has a span of 9.8 m with a Military Load Classification (MLC) of 70(T) for tracked vehicles and MLC 100(W) for wheeled vehicles.



Figure 2.2 – Medium Girder Over Bridge

208. **Constituent parts.** It is supplied as a single, complete set.

209. **Size and transportation.** A single MGOB is supplied on a pair of special purpose flat racks.

210. **Construction and assembly.** All parts are manually assembled. Practised teams can erect an MGOB in a matter of minutes.

211. **Other planning considerations.** Unattended equipment bridges are vulnerable to theft. Its steep approach ramps and lack of substantial side barriers make it unsuitable for unmonitored traffic by civilian vehicles.

212. **Ordering information.**

- a. **Equipment Manager.** MS PT.
- b. **NSN.** 5420-99-020-6297

Section 3 – Heavy Girder Over Bridge

213. **Description and purpose.** Heavy Girder Over Bridge (HGOB) provides a low-profile bridge allowing easier crossing for heavy transporters and tankers on line-of-communication routes. It has a span of 7.6 m with an MCL of 70.



Figure 2.3 – Heavy Girder Over-bridge

214. **Constituent parts.** It is supplied as a single, complete set.
215. **Size and transportation.** A single HGOB is supplied on a flat rack.
216. **Construction and assembly.** Although it could be built by hand, it is far safer to use a Terex AC 35 Capacity 30 T (or equivalent).
217. **Other planning considerations.** Unattended equipment bridges are vulnerable to theft. Its approach ramps are less steep than that of an MGOB but its lack of substantial side barriers make it suitable only as a temporary measure for traffic by civilian vehicles.
218. **Ordering information.**
- a. **Equipment Manager.** MS PT.
 - b. **NSN.** 5420-99-931-9302

Section 4 – Short gap crossing equipment

219. **Description and purpose.** The short gap crossing equipment is designed to allow Land Rovers, Panther, Jackal, and Vixen to cross a 2.5 m gap. It is intended for immediate use, and then recovery.



Figure 2.4 – Short gap crossing equipment

220. **Constituent parts.** The equipment comes as a man-portable set. The heaviest component is 69 kg. The total set (including ancillaries) weighs approximately 157 kg. A future version will be ensure that the heaviest component is 59 kg, reducing the total weight to approximately 129 kg.

221. **Size and transportation.** The equipment will cross a 2.5 m clear span with 0.5 m bank seats on each side.

222. **Construction and assembly.** The equipment is a three-man lift and is designed for All Arms use.

223. **Other planning considerations.** Unattended equipment bridges are vulnerable to theft. The measured gap is from solid points on each bank, not taking into account the angle of repose or the fastness retaining walls. Heaviest vehicle should approach the potential crossing site with the heaviest

axle to within 0.5 m of the bank edge if the bank remains stable then the crossing is safe.

224. **Ordering information.**

- a. **Equipment Manager.** MS PT.
- b. **NSN.** 3990-12-379-5818

Section 5 – Quad bike short gap crossing

225. **Description and purpose.** The Quad Bike Short Gap Crossing (QBSG) can span a 2.5 m gap and carry a quad bike and trailer.



Figure 2.5 – Quad bike short gap crossing equipment

226. **Constituent parts.** The equipment comes as a man-portable set and each ramp weighs 22 kg.

227. **Size and transportation.** The equipment will cross a 2.5 m clear span; the ramps are 3.1 m long.

228. **Construction and assembly.** It can be erected by the vehicle driver.

229. **Other planning considerations.** Unattended equipment bridges are vulnerable to theft. The measured gap is from solid points on each bank not taking into account the angle of repose or the fastness retaining walls. Heaviest vehicle should approach the potential crossing site with the heaviest axle to within 0.5 m of the bank edge; if the bank remains stable then the crossing is safe.

230. **Ordering information.**

a. **Equipment Manager.** MS PT.

b. **NSN.** 3990-99-613-4056

Section 6 – Class 70 Trackway and Bomb Damage Repair Patch

231. **Description and purpose.** Class 70 Trackway provides a quick and simple method of enabling wheeled and rubber tracked vehicles up to Military Load Classification 70 to cross very soft ground in which they would otherwise be bogged down. It is primarily used as an apron to a bridge crossing but can be used at any site where the ground is particularly difficult to cross using wheeled vehicles, for example, fords, beach crossings, diversions around obstacles, recovery of bogged vehicles, and crossing snow. The trackway planks are the same as those in an airfield Bomb Damage Repair Patch (BDRP).

232. **Constituent parts.** It is made up from a series of planks connected together by sliding bolts. A conversion set is used to convert four rolls of Class 70 into one large mat. When supplied as a BDRP it is fitted with fairing panels: shallow ramps to allow smoother transition by aircraft from the runway onto the patch.

233. **Size and transportation.** It is supplied in 15.25 m x 4.6 m sections rolled around a cylindrical frame. Two rolls are carried on a flat rack. A BDRP is 11 m long by 16 m wide but can be reconfigured into a Bomb Damage Repair Mat (BDRM) using two BDRPs.

234. **Construction and assembly.** It is dispensed from its frame using a medium-wheeled tractor and a beam dispenser. Recovery requires a crane.

235. **Other planning considerations.** The trackway must be laid on flat ground and should be pinned in place. This means that preparatory earthwork is required to lay it over existing rutted tracks. It is better therefore to lay the trackway on previously untrafficked ground.

236. **Ordering information.**

a. **Equipment Manager.** Expeditionary Campaign Infrastructure Project Team (ECI PT).

b. **NSN.**

(1)	Trackway:	5680-99-931-7032
(2)	Beam dispenser:	5680-99-405-5025
(3)	Conversion set:	5680-99-931-7131
(4)	BDRP:	5680-99-931-8273

Section 7 – Class 30 Trackway

237. **Description and purpose.** Class 30 Trackway can be used in the same role as Class 70 trackway but with a limit of Military Load Classification 30.



Figure 2.6 – Class 30 Trackway

238. **Constituent parts.** Each roll is formed from interlocked aluminium planks bolted together.

239. **Size and transportation.** It is supplied in 32 m x 3.35 m sections, wound around a cylindrical frame. One roll fits on a flat rack.

240. **Construction and assembly.** It is dispensed from a medium-wheeled tractor using a Beach Dispenser.

241. **Other planning considerations.** See Class 70 Trackway.

242. **Ordering information.**

- a. **Equipment Manager.** ECI PT.

b. NSN.

(1) Trackway: 5680-99-931-7921

(2) LRE: 5680-99-931-7898

Section 8 – AM2 matting

243. **Description and purpose.** The AM2 system is a US product originally bought for the Falklands conflict. Its planks are slotted together to form an expedient Aircraft Operating Surface. It is used primarily for aircraft taxiways, parking aprons and hard standing. It is also used as short take-off strip for helicopters.

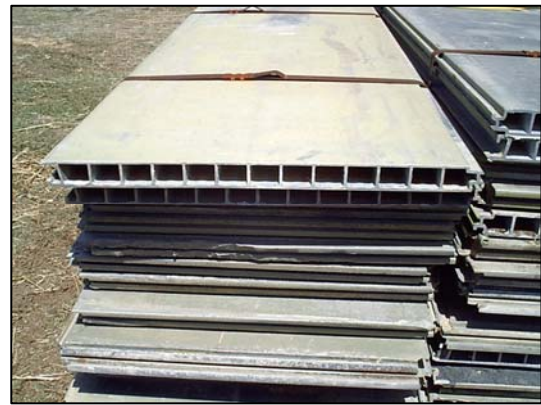


Figure 2.9 – AM2 Matting

244. **Constituent parts.** AM2 is issued as a pallet, consisting of sixteen 12 x 2 ft planks and four 6 x 2 ft planks, along with twenty locking bars used to fix the planks in place once connected. One pallet is sufficient to cover around 40 m²; five pallets are used to make a Helicopter Landing Site (HLS).

245. **Size and transportation.** Four pallets of AM2 matting weigh approximately 1,200 kg and will fill an ISO container.

246. **Construction and assembly.** Planks are assembled and recovered by hand.

247. **Other planning considerations.** It is difficult and expensive to obtain. Its use is strictly controlled by Permanent Joint Headquarters (PJHQ).

248. **Ordering information.** There are a number of specialist AM2 components that are used to connect mats in different configurations, but these are not available through Stores System 3.

- a. **Equipment Manager.** ECI PT.
- b. **NSN.** Single pallet: 5680-01-176-9076

Section 9 – Mammoth matting

249. **Description and purpose.** Mat Set Logistic Trackway commonly known as *Mammoth matting* is a carpet of woven polypropylene geotextile, with steel-wire ropes interwoven along its length and high tensile steel rebar woven across its width. It supplements the use of the existing, more expensive trackway which is used where speed of laying is essential. It is considered a consumable item and once used is not normally expected to be recovered.

250. **Constituent parts.** The mat comes in 4 m (width) x 30 m (mat length) rolls.

251. **Size and transportation.** No special transportation exists and they are usually packed loose on a truck.

252. **Construction and assembly.** It is laid by hand.

253. **Other planning considerations.** The rolls of Mammoth are consumable and not easily recovered for disposal.

254. **Ordering information.**

- a. **Equipment Manager.** ECI PT.
- b. **NSN.** 5680-99-967-7700

Chapter 3 – Protective structures

Section 1 – Hesco Bastion walling

301. **Description and purpose.** Hesco Bastion Concertainers™ are a proprietary gabion walling system made from high-strength steel mesh with a geotextile insert that can be shipped folded flat, and then filled on site to provide blast and ballistic resistant walls, barriers and simple structures.



Figure 3.1 – Hesco Bastion walls

302. **Constituent parts.** These units are available in several sizes, see Table 3.1. The sizes are referred to by the manufacturer's serial number, for example, 'Mil 1'.

Ser	Mil type	Cell size (m) Length x Thickness	Height (m)	Remarks (nominal length)
(a)	(b)	(c)	(d)	(e)
1	1	1.1 x 1.06	1.37	1 x 4- & 1 x 5-cell unit (10 m)
2	2	0.61 x 0.61	0.61	1 x 2-cell unit (1.22 m)
3	3	1 x 1	1	2 x 5-cell unit (10 m)
4	5	0.61 x 0.61	0.61	1 x 5-cell unit (3.05 m)
5	6	0.61 x 0.61	1.68	EPAD side walls 5-cell unit (3.05 m)
6	EPW 1	1.1 x 1.06	2.1	Enhanced Protective Wall (EPW). 6 x 5 cell unit (33 m). A training pack has one 5-bay section. Beige or green.
7	1.9	1.06 x 1.06	2.74	Load bearing unit 3 cell unit (3.18 m)
8	EPA T	0.72 x 0.75	2.06	These sections are used to form EPAT side walls (see below). 2-cell unit (1.52 m) 4-cell unit (3.04 m) 5-cell unit (3.81 m)

Table 3.1 – Hesco Bastion Concertainer™ sizes (Mil #)

303. **Size and transportation.** Hesco Bastion Concertainer™ packing and shipping are detailed in Table 3.2.

Ser	Mil type	Units per pallet	Pallet size (m) (L x W x H)	Pallet Weight (kg)	Pallets Per 13.5m Trailer	Pallets Per 20ft ISO
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	1	7	1.4 x 1.14 x 2.03	1060	18	8
2	2	120	2 x 1.9 x 0.84	1220	18	6
3	3	8	1.17 x 1.17 x 1.78	860	22	10
4	5	50	2 x 1.9 x 0.84	1160	18	6
5	6	27	2 x 1.9 x 0.76	1255	18	6
6	7	1	2.3 x 2.2 x 0.6	980	20	6
7	EPW 1	1	2.3 x 2.1 x 0.84	890	20	6
8	1.9	6	2.74 x 2.18 x 0.8	1220	12	4

Table 3.2 – Hesco Bastion Concertainer™ shipping details

304. **Construction and assembly.** These structures are often built hastily, and due to operational circumstances it is often not practicable to adhere to all of the manufacturer's assembly recommendations. It is therefore important that they are routinely inspected to ensure that they are structurally sound and do not present a hazard to those working or living around them.

305. **Other planning considerations.** The Enhanced Protective Wall (EPW) has a removable pin which allows damaged sections to be extracted and replaced.

306. **Ordering information.**

a. **Equipment Manager.** Expeditionary Campaign Infrastructure Project Team (ECI PT).

b. **NSN.**

EPW1B – F2 5680 99 974 8891

EPW1G – F2 5680 99 155 1977



Figure 3.2 – Enhanced Protective Wall

Section 2 – Expeditionary Elevated Sangar

307. **Description and purpose.** The Expeditionary Elevated Sangar (EES) is a rapidly erectable structure made up of a Cuplok™ scaffold tower and a sangar formed from Hesco gabions. It comes in only one height (3.8 m to the sangar floor) but this is often sufficient to significantly improve arcs of observation.



Figure 3.3 – Expeditionary Elevated Sangar

308. **Constituent parts.** The tower is a modified Cuplok scaffold stock item. The trap door in the sangar floor is a special item made for this purpose. The EES is ordered as a complete set. It comes supplied with a lightning protection system and construction stores packs. It can be fitted with Ballistic Resistant Glazing (BRG). The channels to hold the BRG in place are delivered as part of the EES.

309. **Size and transportation.** A complete EES will fit into 1 x 20ft ISO container. The scaffold tower weighs 5751 kg.

310. **Construction and assembly.** The EES footprint is 5.2 x 5.2 m. Its overall height is 3.8 m. The site must be level, compacted and firm. Good fill material is required; a well-graded construction aggregate, single size aggregate or sand is ideal. 44 m³ of fill is required for the ESS when Mil 1 Hesco only is used, and 53 m³ is required if using Mil 5 sections on the roof. The preferred roof protection consists of two layers of sandbags on top.

311. **Other planning considerations.** The EES require Mechanical Handling Equipment (MHE) to fill Hesco if it is to be done in a reasonable time frame.

312. **Ordering information.**

a. **Equipment Manager.** ECI PT.

b. **NSN.** F2 4940-99-958-5297. This is the complete EES minus Hesco and BRG as described above. Delivery is in 20ft ISO. Other delivery configurations are available

Additional items required are

Mil 1B – NSN F2 5680 99 835 7866 – Qty 3 EA

Mil 5B – NSN F2 5680 99 001 9400 – Qty 4 EA

BRG – NSN F2 4940 99 219 8376 – Qty 1 PK (= 12 Panes)

These items must be demanded separately.

Section 3 – Expeditionary Protective Accommodation Domestic

313. **Description and purpose.** The Expeditionary Protective Accommodation Domestic (EPAD) is a protective accommodation bunker for up to eight personnel. It provides a high degree of protection from weapon effects.



Figure 3.4 – Expeditionary Protective Accommodation Domestic

314. **Constituent parts.** The EPAD is supplied complete with Hesco gabion walls, and aluminium roof and supports. It is not supplied with an air conditioning unit; however, this can be ordered separately.

315. **Size and transportation.** Each EPAD is dispatched in four crates (length 2.3 m, height 1.1 m, width 1 m) each weighing 960 kg. The crates have four way entry pallets as the base and can only be stacked a maximum of two high. Each EPAD has one pack of plywood (28 sheets, 2100 x 1200 mm) weighing 930 kg. The total weight of an EPAD (plus crates and plywood) is 4730 kg. 2 x EPAD can be loaded onto a 20 ft trailer or container. The EPAD can be air dropped.

316. **Construction and assembly.** The EPAD has an external footprint of 14 x 7 m. Internal dimensions are 8.1 x 4.8 m. The door is 1.2 m wide at its narrowest. Although some tools are supplied with the EPAD, the construction force must have its own equipment. Some form of MHE is required to fill the gabions and cover the roof in fill material. Where possible, the chosen site should be firm and level, or it will need preparation to make a

firm, level base. Two EPAD can be constructed together end to end utilising an EPAD Joining Kit.

317. **Other planning considerations.** Good fill material is required: a well-graded construction aggregate, single size aggregate, or sand is ideal. Approx 80 m³ of fill is needed. It has a protected entry point at each end. These must be kept free for fire escape.

318. **Ordering information.**

a. **Equipment Manager.** ECI PT.

b. **NSN.** F2 5410 99 813 3167

Joining Kit – F2 5670 99 248 5185

Section 4 – Expeditionary Protective Accommodation Technical

319. **Description and purpose.** The Expeditionary Protective Accommodation Technical (EPAT) has a larger usable internal space than the EPAD. This makes it a better choice for an Ops room, headquarters, medical facility or other office.



Figure 3.5 – Expeditionary Protective Accommodation Technical.

320. **Constituent parts.** As with the EPAD, the EPAT is supplied complete with Hesco gabion walls, and aluminium roof and supports. It is not supplied with an air conditioning unit; however, this can be ordered separately.

321. **Size and transportation.** Each EPAD is dispatched in four crates (length 2.3 m, height 1.1 m, width 1.2 m) each weighing 1050 kg. The crates have four way entry pallets as the base and can only be stacked a maximum of two high. Each EPAT has one pack of plywood (42 sheets, 1982 x 1220 mm) weighing 960 kg. The total weight of an EPAT (plus crates, OSB Boards and timber) is 5160 kg. Two EPATs will fit onto a 20 ft trailer or container. The EPAT can be air dropped.

322. **Construction and assembly.** The EPAT has an external footprint of 14 x 7.5 m. Internal dimensions are 7.9 x 5.3 m. The entrances have been designed to allow easy access for a stretcher. Although some tools are supplied with the EPAD, the construction force must have its own equipment. Some form of MHE is required to fill the gabions and cover the roof in fill material. Where possible, the chosen site should be firm and level, or it will need preparation to make a firm, level base. Two EPAT can be constructed together end-to-end utilising an EPAT Joining Kit.

323. **Other planning considerations.** Good fill material is required; a well-graded construction aggregate, single size aggregate, or sand is ideal. Approx 145 m³ of fill is needed. It has a protected entry point at each end. These must be kept free for fire escape.

324. **Ordering information.**

- a. **Equipment Manager.** ECI PT.
- b. **NSN.** F2 5410 99 979 3657

Joining Kit – F2 5670 99 352 5583

Section 5 – Lightweight Bunker Roof

325. **Description and purpose.** The Lightweight Bunker Roof (LBR) is intended to provide overhead protection to any space that requires open sided access, such as, vehicle workshops or other facilities at a base that do not have integral protection.



Figure 3.6 – Lightweight Bunker Roof

326. **Constituent parts.** The LBR is only supplied as a roof. No walls are provided.

327. **Size and transportation.** Each LBR is dispatched in one crate (length 2.3 m, height 1.1 m, width 1 m) each weighing 960 kg. The crates have four-way entry pallets as the base and can only be stacked a maximum of two high. The LBR can be air dropped.

328. **Construction and assembly.** Critical to the safety of the LBR is the wall or other support system that is used. Subject to a detailed design, ISO Containers may be used. The roof is 3.0 x 5.0 m in size and requires 10 m³ of fill. A well-graded construction aggregate, single size aggregate, or sand is ideal.

329. **Other planning considerations.** Given that the walls require a local, site-specific design, the LBR should be subjected to close structural monitoring during its use. It is recommended for protective storage rather than for personnel protection.

330. **Ordering information.**

a. **Equipment Manager.** ECI PT.

b. **NSN.** 5410-99-483-2633

Chapter 4 – Domestic accommodation

Section 1 – Improved Tented Camp

401. **Description and purpose.** Improved Tented Camp (ITC) is a system of tents and other items that collectively form a camp. ITC is normally configured into 125-, 250- or 500-man camps, and ordered as a complete camp. However, individual items within ITC may also be ordered.



Figure 4.1 – Improved Tented Camp

402. **Constituent parts.** If an existing camp requires extension, a bespoke 'blister pack' can be drawn up and despatched. When only the tentage and flooring is used, it is referred to a 'Skeleton Camp'. When this is augmented with power and Environmental Control Units (ECUs) it is often referred to as 'Skeleton Camp (+)'. ITC includes:

- Tentage
- Sunshields
- Ablution Units (Type 1 & 2)

- Laundry Unit
- Field Feeding Sensitisation Unit
- Refrigerated Containers
- Ambient Temperature Containers
- Tent Heaters (VAM-40)
- ECU Cooling Unit (15 kW, various models)
- Generators (320 kVA or 350 kVA – various models)
- Water Storage Tanks
- *Rola-Trac* and *Ecogrid* flooring

403. **Size and transportation.** A 125-man ITC Camp requires 50 x 20 ft ISO containers and a 500-man ITC camp requires 130 x 20 ft ISO containers. However, a 150-man Skeleton Camp fitted with ITC-based air-conditioning would require around 15 x 20 ft ISO containers:

- Shelters with flooring, liners and sunshields: six ISO container equivalent.
- ECUs: four ISO container equivalent.
- 2 x 320 kVA generators: one ISO each.
- LAPDS: approximately four ISO containers.

404. **Construction and assembly.** Standard template designs are available from the Military Design Authority. These can be adjusted to suit site-specific conditions. The construction of all elements of ITC are within the skill set of RE field units.

405. **Other planning considerations.** Ground works are required and particular attention must be paid to drainage. Therefore the deployment of an ITC facility invariably brings with it additional financial cost. The footprint of a 500-man camp is around 260 m by 250 m.

406. **Ordering information.** There is no overarching NSN for an ITC Camp. When a whole camp is required the demanding Unit will inform ECI of the requirement and obtain PJHQ's authorisation for release. The AESP can be used to identify all the component parts which could be ordered separately.

a. **Equipment Manager.** Expeditionary Campaign Infrastructure Project Team (ECI PT).

b. **NSN.** There is no overarching UIN.

Section 2 – Improved Tented Camp components

Tentage

407. **Description and purpose.** An Improved Tented Camp (ITC) is made up of normal GS tents which are supplied in various sizes. They are used in conjunction with a liner and a sunshade when deployed in hot climates. There are no workshop type tents in ITC, nor are there any other large span tent for use as a dining room, or gym, for example.

408. **Constituent parts.** Care should be taken to ensure that the whole tent and its constituent parts are ordered.

409. **Size and transportation.** They are transported on Thatcham pallets. The largest tent (18 x 24 c/w porch and insulation) weighs 450 kg and uses 1 x large pallet.

410. **Construction and assembly.** Unskilled, but supervised labour is needed.

411. **Other planning considerations.** None.

412. **Ordering information.**

a. **Equipment Manager.** ECI PT.

b. **NSN.**

18 x 24 tent:	8340-99-891-0224
18 x 24 tent c/w porch and insulation:	8340-99-861-0226
18 x 24 sunshield:	8340-99-575-0779
12 x 12 tent:	8340-99-984-7785
12 x 12 tent c/w insulation:	8340-99-323-2286
12 x 12 sunshade:	8340-99-884-6622
9 x 9 tent:	8340-99-152-8873

Refrigeration and freezer unit

413. **Description and purpose.** The unit is built into an insulated 20 ft ISO container that is divided into two compartments by a movable inner wall. Although it has its own external generator, it can also take an external power supply.



Figure 4.2 – ITC, Refrigeration and freezer unit

414. **Constituent parts.** Supplied as a container with internal fittings and inbuilt generator.
415. **Size and transportation.** It can be stacked five high and weighs 4,000 kg when empty. It is not air transportable.
416. **Construction and assembly.** Negligible.
417. **Other planning considerations.** Operating range: -31°C to +39°C.
418. **Ordering information.**
- a. **Equipment Manager.** ECI PT.
 - b. **NSN.** 4110-99-376-1818

Flooring

419. **Description and purpose.** *Rola-Trac* is used as internal flooring and open-sectioned *Ecogrid* is used to form walkways around the camps.

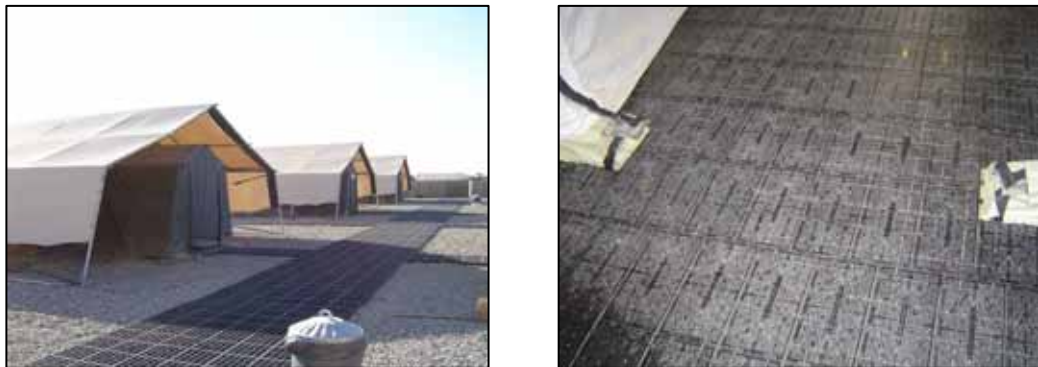


Figure 4.3 – *Ecogrid* and *Rola-Trac* Flooring

420. **Constituent parts.** The flooring consists of plastic tiles that lock together using T-Shaped projections and apertures. Although the tiles are small, both floorings are issued in multiples of approx 1 m² slabs.
421. **Size and transportation.** Both floorings are transported on standard NATO pallets and stand approx 6 ft high.

422. **Construction and assembly.** They are hand assembled.

423. **Other planning considerations.** When calculating the internal dimensions for Rola-Trac, the flooring does not perfectly fit any of the current shelters and will leave a space around the edges. Note also that the ITC tent sizes are nominal (24 x 18). This is not the exact floor size as they are approximately 1ft wider than their sizes suggest. Neither flooring system is impermeable. This means that fluid spills and dust accumulate under them. This can cause a problem for places where cleanliness is essential.

424. **Ordering information.** The DofQ¹ of EcoGrid is a 'pack', whereas the DofQ of Rola-Trac is 'each'.

a. **Equipment Manager.** ECI PT.

b. **NSN.** Rola-Trac, 8340-99-551-0054.

Ecogrid, 9330-99-858-1406.

15 kW Environmental Control Unit

425. **Description and purpose.** The Environmental Control Unit (ECU) provides effective temperature control between and -10°C and +60°C. Below that temperature, portable space heaters should be used.

¹ Denomination of Quantity (DofQ), may be replaced by Unit of Issue (UOI).



Figure 4.4 – 15 kW Environmental Control Unit

426. **Constituent parts.** The ducting is supplied separately and should be demanded individually depending upon desired configuration.
427. **Size and transportation.** Each unit is 1.8 x 1.3 x 1.1 m and weighs 540 kg.
428. **Construction and assembly.** MHE is needed to move these units.
429. **Other planning considerations.** One ECU unit feeds two tents.
430. **Ordering information.**
- a. **Equipment Manager.** ECI PT.
 - b. **NSN.** 4120-99-382-4602

ITC Ablution Unit

431. **Description and purpose.** The ITC Ablution Unit consists of containerised toilets and showers for use on ITC camps. Each unit contains either three toilets and three showers (types 1 and 3, where 3 is the field

hospital version) or five toilets (type 2). They all also contain sinks and mirrors.

432. **Constituent parts.** It is a single containerised item.

433. **Size and transportation.** Each unit equates to a 20 ft ISO.

434. **Construction and assembly.** The waste water system is gravity operated. It is therefore essential that the container be positioned with a fall from the front (door end) to the back.

435. **Other planning considerations.** None.

436. **Ordering information.**

a. **Equipment Manager.** ECI PT.

b. **NSN.**

Type 1: 4630-99-908-6006

Type 2: 4630-99-430-4169

Type 3: 4630-99-908-6515

Section 3 – Heating and air conditioning

437. **Description and purpose.** There are four types of heater available. All take an electrical power supply.

a. **Dantherm ACM7 Air Conditioning Unit, ACM7.** It is 1,234 x 984 x 934 mm, weighs 190 kg and takes a 400 V supply. NSN: 4120-22-608-7843.

b. **Dantherm VAM15 Space Heater, VAM 15.** It is 605 x 1360 x 490 mm, weighs 93 kg and takes a 230 V. The maximum heat output is 18.6 kW. NSN: 4520-22-613-3506.

c. **Dantherm VAM40 Space Heater, VAM 40.** It is 890 x 1400 x 700 mm, weighs 129 kg, and takes a 230V supply. The maximum heat output is 38 kW. NSN: 4520-22-601-5271.

d. **Zhendre CTZ10 Environmental Control Unit, CTZ10 ECU.** It is 1265 x 1420 x 1100 mm, weighs 235 kg and takes a 3-phase 400 V supply. The maximum heat output is 10 kW. NSN: 4120-14-488-9645.

Section 4 – Basic Field Hygiene Unit

438. **Description and purpose.** The Basic Field Hygiene Unit (BFHU) is a complete system for providing showers and hot water washing.

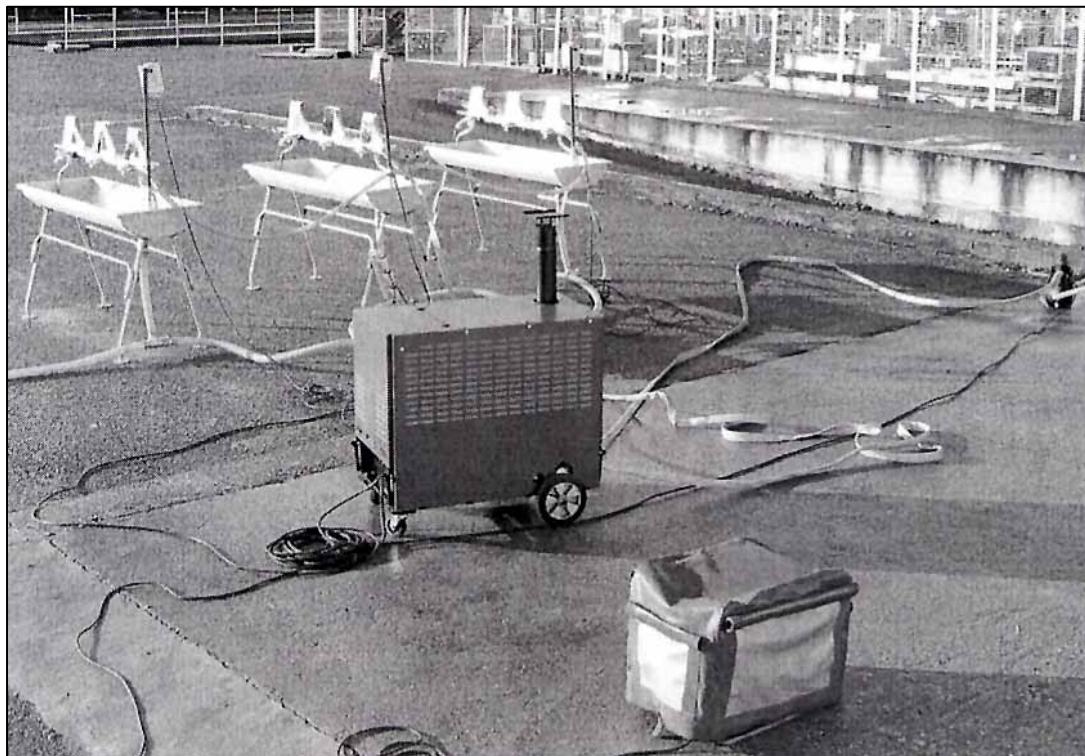


Figure 4.5 – Basic Field Hygiene Unit

439. **Constituent parts.** It comprises a water heater, pump, washbasin kit, generator, water tank (2000 litres) and tented shower system. It heats 800 litres per hour and can be augmented with standalone shower cubicles.

440. **Size and transportation.**

- Water Heater: 1.21 x 1.23 x 0.88 m, 243 kg
- Water Pump: 0.73 x 0.81 x 0.36 m, 44 kg
- Washbasin Kit: 1.05 x 1.9 x 1.4 m, 355 kg
- Generator: 0.82 x 0.81 x 0.56 m, 104 kg
- Water Tank: 0.74 x 0.96 x 0.96 m, 110 kg
- Tented Shower System: 0.91 x 2.06 x 0.82 m, 350 kg

441. **Construction and assembly.** It is easily assembled by hand.

442. **Other planning considerations.** Each element may be ordered separately. The system runs on 110 V, except the washbasin, which is 12 V.

443. **Ordering Information.** Each element may be ordered separately.

a. **Equipment Manager.** ECI PT.

b. **NSN.**

Water Heater: 4520-99-225-8728

Water Pump: 4320-99-666-1853

Wash Basin Kit: 4510-99-500-5351

Generator: 6115-99-836-4182

Water Tank: 5430-99-957-9996

Tented Shower System: 4510-99-355-4713

Section 5 – Tactical Base Ablution Unit

444. **Description and purpose.** The Tactical Base Ablution Unit (TBAU) provides toilet, shower and washing facilities for up to 30 personnel. It has a surge capacity capable of supporting an additional 20 personnel for up to seven consecutive days. It is divided into two sections consisting of an ablution room and a plant room. As a self-contained system, it does not require connection to external power, water or waste infrastructure. It is powered by a Combined Heat and Power Unit (CHP) that provides a generating system delivering efficient, low maintenance generation of DC electric power. It is equipped with a control panel, battery pack, hot water cylinder, grey-water recycling filter system and a black waste incinerator. It recycles all its water. If required, the TBAU is fitted with connections suitable for integration with on-site facilities for power, water supply and waste disposal. Its design is optimised to operate in a location that has a scarce water supply and relatively low occupancy level.



Figure 4.6 – Tactical Base Ablution Unit

445. **Constituent parts.** The TBAU is installed within a lightweight welded stainless steel frame and the walls are double-skinned extruded PVC panels which slot between picture frame style mounting supports, which are fixed to the uprights of the unit frame. The plant room provides the power and equipment to run and control the ablution unit.

446. **Size and transportation.** The TBAU fits inside a 20 ft ISO. It is fitted with multiple lifting points and can be slung under a helicopter. Fork pockets are provided at the base at one end of the unit and on both sides

447. **Construction and assembly.** When configured for storage or transportation in an ISO container, the ablution roof is lowered. Once on site the ablution roof is raised and the unit is set up for use; an operation that can be carried out by two trained personnel in under an hour.

448. **Other planning considerations.** The TBAU runs on diesel and can hold 220 litres. The clean water tank capacity is 1000 litres. When serving the numbers of personnel for which it was designed, it will consume 12 litres of diesel/day and 4.2 litres of water/day. Its dimensions are:

- Overall Length: 5800 mm
- Overall width: 2195 mm
- Overall Height (transport height to top of plant room roof): 2140 mm
- Overall Height (Set up for use): 2471 mm
- Overall weight (Tanks empty): 3500 kg
- Overall weight (Tanks empty): 4750 kg
- Overall weight 20 ft ISO Container: 2150 kg

449. **Ordering Information.**

- a. **Equipment Manager.** ECI PT.
- b. **NSN.** J3 5410-99-726-0411

Section 6 – Operational Field Catering System

450. **Description and purpose.** The Operational Field Catering System (OFCS) provides catering facilities (oven, hotplate and water heater),

thermally insulated hot food and drink distribution facilities, and cooking utensil sanitation facilities. Each system is designed to support around 40 personnel. When set up, it fits into a 12 ft x 12 ft tent.



Figure 4.7 – Operational Field Catering System

451. **Constituent parts.** It is made up of a number of catering systems and is supplied with a tent specially fitted with fume extractor points.
452. **Size and transportation.** In transportation it is 2.3 x 1.36 x 1.150 m.
453. **Construction and assembly.** It is assembled by hand.
454. **Other planning considerations.** It runs off a 24–27 V supply. The power source is not supplied and fuel is required for the burners (AVTUR, AVTUR/FSII, AVCAT/FSII, Kerosene and Diesel).
455. **Ordering information.**
- a. **Equipment Manager.** ECI PT.
 - b. **NSN.** 7310-99-908-6593

Chapter 5 – Technical accommodation

Section 1 – Deployable Engineer Workshop

501. **Description and purpose.** The Deployable Engineer Workshop (DEW) is a fully equipped workshop facility designed for use by RE artisans. A DEW facilitates the repair and manufacture of items from wood and metal.



Figure 5.1 – Deployable Engineer Workshop

502. **Constituent parts.** There are four components based in twelve 20 ft ISO containers. There are soft-walled, covered work spaces, called Single Container Workshops (SCW), which can be added to these, effectively doubling the work area. A larger soft walled large Main Working Area (MWA) is also supplied.

503. **Size and transportation.** A single DEW is transported in 12 x 20 ft ISO containers.

504. **Construction and assembly.** The required area for the DEW is approximately 3500 m² when fully deployed as one unit.

505. **Other planning considerations.** It is an air conditioned containerised system with all weather SCWs and a large tented MWA. Working temperatures range from -29°C to +49°C

506. **Ordering information.**

a. **Equipment Manager.** Deployable Mechanical Repair Systems (DMRS) Deployable Test and Support Equipment Project Team (DS&TE PT).

b. **NSN.** 5410-99-168-0552

Section 2 – Rapid Erection Shelter

507. **Description and purpose.** Rapid Erection Shelters (RES) are temporary shelters used for protection of fixed and rotary wing aircraft, ground vehicles and storage facilities. Aircraft Environmental Shelters (AES), also known as 'sunshades' are RES without the doors.



Figure 5.2 – Rapid Erection Shelters

508. **Constituent parts.** The RES consists of a shelter, ECU/ACU and lighting. All RES come with blank ends and/or doors dependant on the requirement.

509. **Size and transportation.** There are two sizes 20 x 30 x 8.3 m and 25 x 36 x 11 m. Each RES is moved in an ISO container.

510. **Construction and assembly.** They are designed to be rapidly deployable, either on hard standing with ground anchors or with ballast, where appropriate. ECU, lighting and door configuration are bespoke to the individual RES requirement and will need to be considered before ordering. Construction has to be carried out by trained personnel and the building needs to be constructed on a suitable concrete base.

511. **Other planning considerations.** They are PVC covered portal framed structures and are used for a variety of purposes including, but not limited to, aircraft. Before requesting an RES, a site survey needs to be carried out.

512. **Ordering information.**

a. **Equipment Manager.** Expeditionary Campaign Infrastructure Project Team (ECI PT).

b. **NSN.**

20 x 30 x 8.3 m: 5410 99 474 5751 or 5410 99 213 3398 (with Trident Door/Roller Shutter Door)

25 x 36 x 11 m:

5410 99 730 9292, 5410 99 931 3101 (Heli Door/Blank End with Crane)

5410 99 236 5946 (Heli Door/Blank End or Heli Door/Heli Door)

Section 3 - Environmentally Controlled Ammunition Storage Shelter

513. **Description and purpose.** The Environmentally Controlled Ammunition Storage Shelter (ECASS) is intended for use as storage for air launched munitions.



Figure 5.3 – Environmentally Controlled Ammunition Storage Shelter

514. **Constituent parts.** The RES consists of a shelter, ECU/ACU and lighting.

515. **Size and transportation.** The ECASS measures 9.1 x 16 m and is transported in an ISO container.

516. **Construction and assembly.** It can be anchored down by concrete ballast blocks (shown) onto matting or hardcore, for example, or by ground anchor bolts into concrete.

517. **Other planning considerations.** Depending on the ambient temperature, the ECASS requires up to four 25 kW ECUs to maintain munition life.

518. **Ordering information.**

- a. **Equipment Manager.** ECI PT.
- b. **NSN.** 5410-99-739-8291

Section 4 – Norwegian Variant Shelter

519. **Description and purpose.** The Norwegian Variant Shelter (NV) is used as a second-line maintenance and support building.



Figure 5.4 – Norwegian Variant Shelters

520. **Constituent parts.** The NV consists of a shelter, ECU/ACU and lighting.

521. **Size and transportation.** The NV comes in various sizes and requires 3 x ISO containers for transportation. It can be fitted with either fast jet doors or roller shutter doors (shown).

522. **Construction and assembly.** It can be anchored down by concrete ballast blocks (shown) onto matting or hardcore, for example, or by ground anchor bolts into concrete.

523. **Other planning considerations.** A site survey is required.

524. Ordering information.

a. **Equipment Manager.** ECI PT.

b. **NSN.**

25 x 30 x 12.2 m: 5430 99 154 2935, 5430 99 303 3222 (5 x 5 Roller Shutter Door)

25 x 42 x 12.2 m: 5430 99 29 2228 (5 x 5 Roller Shutter Door)

20 x 39 x 12.2 m: 5430 99 858 1060

20 x 24 x 12.2 m: 5430 99 858-5670

20 x 24 x 8.9 m:

6145 99-254-2363 (Fast Jet Door/Fast Jet Door),

5430 99 967-8818 (Fast Jet Door/Roller Shutter Door)

5430 99 614-0530 (Roller Shutter Door/Roller Shutter Door)

20 x 27 m: 5430 99 000-6576

Section 5 – Rapid Erect Hangar

525. **Description and purpose.** Rapid Erect Hangars (REH) are large enough to accept CH47 with rotor blades spread.



Figure 5.5 – Rapid Erect Hangar

526. **Constituent parts.** The REH consists of a shelter, ECU/ACU and lighting. However, the thin, translucent roof of these structures makes them impossible to air-condition effectively.

527. **Size and transportation.** The dimensions of the REH are 23 x 36 x 8.5 m. Each shelter requires 2 x ISO containers for transportation. An REH can be fitted with either fast jet doors or roller shutter doors.

528. **Construction and assembly.** They can be anchored down by concrete ballast blocks (shown) onto matting or hardcore, for example, or by ground anchor bolts into concrete.

529. **Other planning considerations.** A site survey is needed.

530. **Ordering information.**

- a. **Equipment Manager.** ECI PT.
- b. **NSN.** 5430 99 127 4641

Section 6 – Rapid Erect Building

531. **Description and purpose.** Rapid Erect Buildings (REB) is a sunshade used for housing Tornado/Typhoon.



Figure 5.6 – Rapid Erect Building

532. **Constituent parts.** The REB consists solely of a shelter.

533. **Size and transportation.** The dimensions of the REB are 18 x 18 m. It can be moved in a single ISO container.

534. **Construction and assembly.** Can be anchored down by concrete ballast blocks (shown) onto matting or hardcore, for example, or by ground anchor bolts into concrete.

535. **Other planning considerations.** A site survey is needed.

536. **Ordering information.**

- a. **Equipment Manager.** ECI PT.
- b. **NSN.** 5430 99 563-5424

Chapter 6 – Medical facilities

Section 1 – Field Hospital

601. **Description and purpose.** The Field Hospital provides a 200-bed, Role 3, medical facility. It has operating theatres, X-ray, resuscitation, recovery, dental and physio wards.

602. **Constituent parts.** Many of its constituent parts are the same as those of an ITC camp, and its core structure is based on multiples of the 18 x 24 ft tent. It is also powered by the same Cat 320 kVA generators used in ITC.

603. **Construction and assembly.** Its construction requires care.

604. **Other planning considerations.** In order to produce a flooring system that can be hygienically cleaned, sealed concrete floors have been used.

605. **Ordering information.** The Field Hospital includes tents, privacy screens, sinks, etc. However, it has no medical equipment as such. It does not include a CT Scanner. This must be set up inside a specifically procured, specialist, lead-lined cabin.

a. **Equipment Manager.** Expeditionary Campaign Infrastructure Project Team (ECI PT).

b. **NSN.** There is no single NSN for a complete hospital.

Section 2 – Field Hospital components

Mortuary Unit

606. **Description and purpose.** The Mortuary Unit is a converted cold store 20 ft ISO container with an external generator. It has room for eight coffins.

607. **Ordering information.**

- a. **NSN.** 4110-99-908-6483

Hospital Drug Storage Unit

608. **Description and purpose.** The Hospital Drug Storage Unit is a converted cold store 20 ft ISO container with an external generator. It has chilled and frozen storage compartments for pharmaceutical stores. It can be operated between -29°C and +29°C.

609. **Ordering information.**

- a. **NSN.** 4110-99-908-6509.

Clinical Waste Incinerator

610. **Description and purpose.** The Clinical Waste Incinerator is an oil-fired incinerator approved for the disposal of clinical waste. Only incinerators meeting a specific set of criteria may be used for this purpose.

Chapter 7 – Utilities: power, water, fuel and waste

Section 1 – Lightweight Field Generator

701. **Description and purpose.** The Lightweight Field Generator (LFG) is can provide 230 V or 110 V, 50 Hz single-phase AC power with a simultaneous 28 V DC output. The normal power available is 2 kW continuously; however, the generator is capable of sustaining an overload of up to 2.2 kW for a maximum duration of one hour in every 12 hours of operation.



Figure 7.1 – Lightweight Field Generator

702. **Constituent parts.** The generator comes with an earthing spike and exhaust extension.

703. **Size and transportation.** The dimensions are 550 x 600 x 500 mm and it weighs 76 kg. The LFG is suitable for transportation by land, sea or air. However, it contains a powerful permanent magnet generator and care must be taken not to position it near equipment that may be susceptible to a strong magnetic field. The LFG can be airdropped.

704. **Other planning considerations.** It runs on both Diesel (F54) fuel and AVTUR (F34); AVTUR is the preferred fuel.

Utilities: power, water, fuel and waste

705. **Ordering information.**

- a. **Equipment Manager.** Battlefield Utilities Project Team (BFU PT).
- b. **NSN.** 6115-99-908-6784

Section 2 – Field Electrical Power System

706. **Description and purpose.** The Field Electrical Power System (FEPS) is a series of generators that are capable of delivering a range of power outputs. When power requirements exceed the capabilities of a single generator set, paralleling facilities enable connection to one or more additional generator sets of the same type for load sharing purposes. Every FEPS generator set can operate as the master or a slave in a parallel arrangement with other generators. When operating in parallel mode, all FEPS generators have automatic synchronisation and sequencing facilities. Output voltage and frequency are automatically controlled, and the generator set is protected from damage by a control protection system. There are three FEPS types:

- **8/12 kW FEPS.** 8 kW single phase, 12 kW three phase.
- **16/24 kW FEPS.** 16 kW single phase, 24 kW three phase.
- **40 kW FEPS.** 34 kW single phase, 40 kW three phase.



Figure 7.2 – Field Electrical Power System

707. **Constituent parts.** It is not supplied with an integral distribution system.

708. **Size and transportation.** The FEPS weighs between 3064-3384 kg. All three systems look alike from the outside. They are 5562 (l) x 2580 (w) x 2412 (h) mm. They are capable of being towed behind in-service trucks on road, with the exception of MAN SV; modifications are still in development. FEPS generator sets can be transported by air and sea when suitably lashed, without detriment to performance.

709. **Other planning considerations.** Once the FEPS unit has been manoeuvred into position, the prop stands deployed and any paralleling arrangements set up, only one person is required for periodic output and performance monitoring, and re-fuelling.

710. **Ordering information.**

a. **Equipment Manager.** BFU PT.

b. **NSN.**

8/12 kW FEPS: 6115-99-908-6436

16/24 kW FEPS: 6115-99-908-6434

40 kW FEPS: 6115-99-908-6435

Section 3 – Field Electrical Power Distribution System

711. **Description and purpose.** The Field Electrical Power Distribution System (FEPDS) system comprises a variety of modules, connectors and cables which are connected together according to operational requirements. Power is distributed to the user via an interface unit and/or a network of distribution boxes and associated cables. The interface unit may be a mains interface unit (MIU) or a generator interface unit (GIU). FEPDS is commonly used with the FEPS generator variants that can be connected in parallel.

712. **Constituent parts.** See NATO Stock Numbers (NSN).

Utilities: power, water, fuel and waste

713. **Size and transportation.** Items are either boxed, or are robust units that can be manually handled. Nothing is more than a two-man lift.

714. **Construction and assembly.** Only trained personnel may set up the system. Once installed, it should be commissioned by suitably qualified personnel.

715. **Other planning considerations.** FEPDS can be configured to connect to the Lighting and Power Distribution System (LAPDS). The LAPDS must only be set up by a qualified electrician.

716. **Ordering information.**

a. **Equipment Manager.** BFU PT.

b. **NSN.**

FEPS - LAPDS Generator Interface Unit (GIU): 6115-99-724-5224

4-WAY Generator Interface Unit (GIU): 6115-99-998-9310

Dual Input Shelter Distribution Unit (SDU): 6110-99-679-8458

3-PH to 1-PH Splitter Unit (SU): 6110-99-579-8018

3-PH to 3-PH Splitter Unit (ECSU): 6110-99-584-2091

Shelter Distribution Unit (SDU): 6110-99-613-2538

6-Way 16A Distribution Unit: 6110-99-816-6138

External Domestic Power Unit (EDPU): 6110-99-925-0566

Section 4 – Borehole Well-head Unit



Figure 7.3 – Borehole Well-head Unit

717. **Description and purpose.** Water from a borehole passes through a well-head unit. This well-head is contained within a GRP enclosure, which is also incorporates basic filtration and UV sterilisation and chlorination dosing. Storage is provided by single/multiple 70 m³ Oxfam tanks: quantity dependant on location requirements.

718. **Constituent parts.** It requires a 415 V electrical supply to the borehole pump and 230 V to GRP enclosure, which contains the sterilisation and dosing equipment. Connections are made using MDPE compression and BSP pipe fittings.

719. **Size and transportation.** The well-head enclosure measures 3.16 x 2.6 x 2 m and the Oxfam Tank is 6.40 x 2.29 m high. They easily fit in a 20 ft ISO container.

720. **Construction and assembly.** The borehole, its treatment and associated storage should be designed by 521 STRE (WD), a specialist MDA unit. The construction of the borehole itself requires specialist plant and construction material.

721. **Other planning considerations.** Gravity-fed outlets close to the storage units can be used, but for greater heads, pumped distribution is required. The Pump Pressurization Unit (PPU) provides this.

Utilities: power, water, fuel and waste

722. **Ordering information.**

- a. **Equipment Manager.** BFU PT.
- b. **NSN.** Around 80% of the items are available through the NSN codified Water Development Task Stores (WDTS). Bespoke systems, and some construction stores, will require commercial sourcing through BFU/ECI PT.

Section 5 – Water Purification Unit (NBC) Standard

723. **Description and purpose.** The Water Purification Unit (WPU) (NBC) Standard is designed to produce drinking water from any surface water, except sea water,¹ which may have been contaminated by: naturally occurring pollutants, industrial/agricultural effluents and chemicals, or Nuclear, Biological and Chemical (NBC) agents. The equipment comprises all items required to extract,² purify, store and distribute water. All items are mounted/stowed in a Chemical Agent Resistant Material (CARM) covered frame which is primarily designed for transportation on an adapted 2½ tonne, two wheeled, flat-platform trailer. The equipment, which can be operated either on or off the trailer, has three modes of operation that are determined by the type of contamination of the source water and the geography of the extraction site.



Figure 7.4 – WPU(NBC) Standard

¹ However, a few units have been converted to take a saline water source.

² From a surface source.

724. **Constituent parts.** The unit comes with basic hoses.

725. **Size and transportation.** The equipment can be under-slung from a helicopter, and is air portable within a C130 aircraft. (However, it cannot be airdropped). The equipment can be towed using the NATO standard hitch. The WPU unit has lifting eyes and fork pockets (fork extensions must be used).

726. **Construction and assembly.** It can be set up in a matter of hours. Hose lengths allow a maximum of 223 m from source to issue point.

727. **Other planning considerations.** It requires close monitoring during operation. The equipment is designed to deliver 164,000 litre/day (6,840 litre/hour) of potable water in the non-NBC mode, high or low pressure, or 45,000 l/day (1,900 litre/hour) in the NBC mode. With all pumps running the equipment uses 7.5 l diesel per hour. To operate and produce potable water; stocks of the following chemicals are required.

- Pre-filtration aid – kieselguhr (diatomaceous earth).
- Chlorination – calcium hypochlorite.
- Biocide/anti freeze (preservative) – sodium metabisulphite and glycerol.
- Acid clean (descaling) – critic acid GPR.
- Alkali clean – sodium hydroxide and sodium lauryl sulphite.

728. **Ordering information.**

a. **Equipment Manager.** BFU PT.

b. **NSN.** 4610-99-244-2783

Trailer, Flat Platform: 2330 99 891 6453

Trailer, Flat Platform – MK: 32330 99 908 6470

Utilities: power, water, fuel and waste

Filter Assembly, Module: 4610 99 108 6762

Pumping Unit (Source): 4320 99 830 8283

Pumping Unit (Distribution): 4320 99 192 2265

Storage and Distribution Set: 5430 99 783 1242

Original Tanks Only: 5430 99 000 5518

New Tanks (ERMs: RV60AA to RV77AA): 5430 99 908 6072

TFC x 2 [3,000 Gal (13,640 litres)]

Section 6 – Water Purification Unit (Standard)

729. **Description and purpose.** The WPU (Standard) provides potable water from a surface source, by filtering and sterilising it. The unit consists of a diesel engine axial flow pump, filter, chlorinator and associated pipes which feed into two 2,250gal (10,300 litre) tanks. There are two pump variants, the Hamworthy and the Davey.

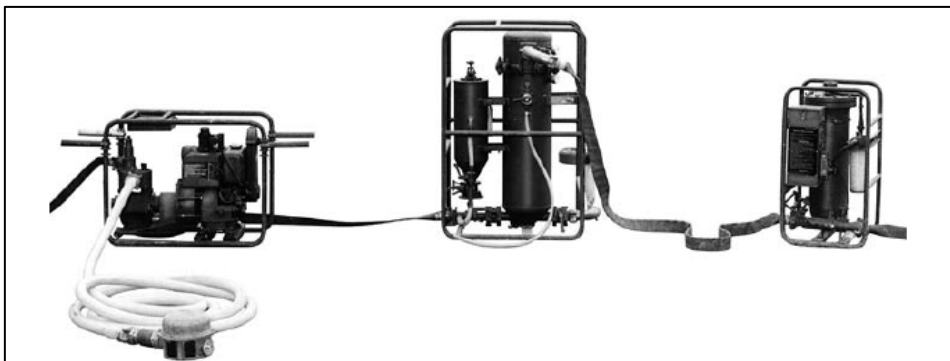


Figure 7.5 – WPU (Standard)

730. **Constituent parts.** The unit comes with its basic hoses.

731. **Size and transportation.** Once packed, the equipment fits into a $\frac{3}{4}$ tonne trailer. It can be towed and is transportable by air, under slung or within an aircraft.

732. **Construction and assembly.** The maximum height from source to storage should not exceed 25.3 m. The maximum distance from pump to storage is 64.1 m. This is determined both by equipment capability and actual hose lengths.

733. **Other planning considerations.** Under average conditions, a pumping capacity of 6,820 litres/hour may be assumed. The equipment is designed to provide water for a battle group sized force in the field.

734. **Ordering information.**

a. **Equipment Manager.** BFU PT.

b. **NSN.**

Hamworthy: 4610 99 908 5352 (Davey: 4610 99 453 1894)

WPU (Std) Complex: 4610 99 206 1232

Pumping Assembly: 4610 99 783 1238 (Davey 4610 99 908 5657)

Pump Only: 4610 99 908 5657

Filter Set: 4610 99 783 1236

Stella Meta™ Filter Only: 4610 99 205 5182

Variable Volume Doser Set: 4610 99 732 8805

Variable Volume Doser (VVD): 4610 99 797 2782

Tank and Dispensing Kit, Standard: 5340 99 783 1242

TFC x 2 [2,500 Gal (11,360 litre)]: TFC: J11 5430 99 138 9378

Section 7 – Water Purification Unit (Small Groups)

735. **Description and purpose.** The WPU Small Groups (SG) provides for a company sized unit (200 people) in field conditions for a limited period (30 days). WPU(SG) is a modular water supply piece of equipment, similar to the WPU(S) but much smaller in size and limited in capability. It is simple and reasonably foolproof to operate. It has a very high technical specification and great confidence can be assumed in the quality of its product providing the set is operated properly.



Figure 7.6 – WPU (Small Groups)

736. **Constituent parts.** It is made up of an Electrics Pack (EP), Filtration Pack (FP), Distribution Pack (DP) and Source Pack (SP). Associated equipment includes MOD Kit, Vehicular (Spares Pack) NSN: NR 4320 99 766 7635.

737. **Size and transportation.** The equipments will fit into a $\frac{3}{4}$ tonne trailer.

738. **Construction and assembly.** The pump is electric and uses a 110 V supply. The equipment can be set up by two people, however, only a one person is required to operate it.

739. **Other planning considerations.** The storage tank has a capacity of 5,000 litres. The source tank has a capacity of 2,200 litres. The maximum distance from source to distribution is 60 m. The generator will use 0.65 to 1 litre of diesel an hour depending on deployment of lighting and trace heating.

740. **Ordering information.**

- a. **Equipment Manager.** BFU PT.
- b. **NSN.** NR 4610 99 908 6441

Section 8 – Joint Operational Fuel System

741. **Joint Operational Fuel System.** The Joint Operational Fuel System (JOFS) is a family of fuel equipments.

Heavy Duty Pump System

742. **Description and purpose.** The Heavy Duty Pump Set (HDPS) is the most capable of the pumps. It has a separate pump and engine in order to comply with safety regulations.

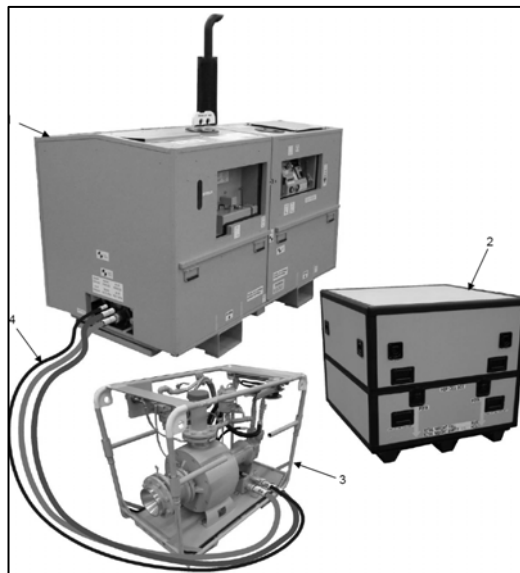


Figure 7.7 – JOFS Heavy Duty Pump Set

Utilities: power, water, fuel and waste

743. **Constituent parts.** The set includes the power pack, pump, hydraulic hoses and a CES box. The pump has 6" suction and 4" discharge victaulic pipe connections. Both the power pack and pump are connected by flow, return and drain hydraulic hoses.

744. **Size and transportation.** The power pack should be lifted by MHE but can also be manually handled. The HDPS is air portable when dry and gas free.

745. **Construction and assembly.** The HDPS must be installed by specialist personnel.

746. **Other planning considerations.** The HDPS is capable of pumping fuel at a rate of 2000 litres/minute into a 4" diameter pipe. The pump's 115 litre diesel fuel tank gives it an eight hour duty cycle.

747. **Ordering information.**

a. **Equipment Manager.** BFU PT.

b. **NSN.** 4320-99-667-6586

Heavy Duty Power Pack (HDPP): 6115-99-879-0888

Heavy Duty Pump (HDP): 4320-22-620-7550

Hydraulic Hose Assemblies (HHAs) as follows:

HHA (Pressure) 15 metres x 1 inch diameter: 4720-99-813-2478

HHA (Return) 15 metres x 1 1/4 inch diameter: 4720-99-813-2477

HHA (Drain) 15 metres x 1 1/2 inch diameter: 4720-99-553-3135

Complete Equipment Schedule (CES) box: 8145-99-151-7207

Medium Duty Pump System

748. **Description and purpose.** The Medium Duty Pump Set (MDPS) provides a medium range fuel-pumping capability.

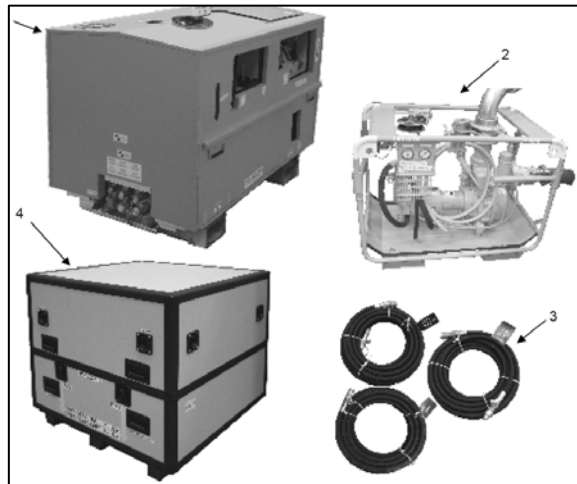


Figure 7.8 – JOFS Medium Duty Pump Set

749. **Constituent parts.** The MDPS has suction and discharge 4" victaulic pipe connections. Both the power pack and pump are connected by flow, return and drain hydraulic hoses.

750. **Size and transportation.** The MDPS should be lifted by MHE, but can also be manually handled. The MDPS is air portable when dry and gas free.

751. **Construction and assembly.** The MDPS must be installed by specialist personnel.

752. **Other planning considerations.** The MDPS is capable of pumping fuel at a rate of 680 litres/minute into a 4" diameter pipe. The MDPS's 40 litre diesel fuel tank gives a six hour duty cycle.

753. **Ordering information.**

- a. **Equipment Manager.** BFU PT.
- b. **NSN.** 4320-99-151-6887

Utilities: power, water, fuel and waste

Medium Duty Power Pack (HDPP): 6115-99-813-2134

Medium Duty Pump (HDP): 4320-22-620-7551

Hydraulic Hose Assemblies (HHAs) as follows:

HHa (Pressure) 15 metres x 3/4 inch diameter: 4720-99-836-8610

HHa (Return) 15 metres x 3/4 inch diameter: 4720-99-667-6574

HHa (Drain) 15 metres x 1/2 inch diameter: 4720-99-553-3135

Complete Equipment Schedule (CES) box: 8145-99-474-6902

Section 9 – Tank Fabric Collapsible

754. **Description and purpose.** The Tank Fabric Collapsible (TFC) is a flexible container that provides a fast, efficient and reliable way of storing small to large quantities of liquid. Although intended for fuel, it can be used to hold water if it has not been used before. The tanks are made of a rubber compound and when full of liquid, look like large pillows. They can be relocated and reused faster than any metal container of like size or capacity.

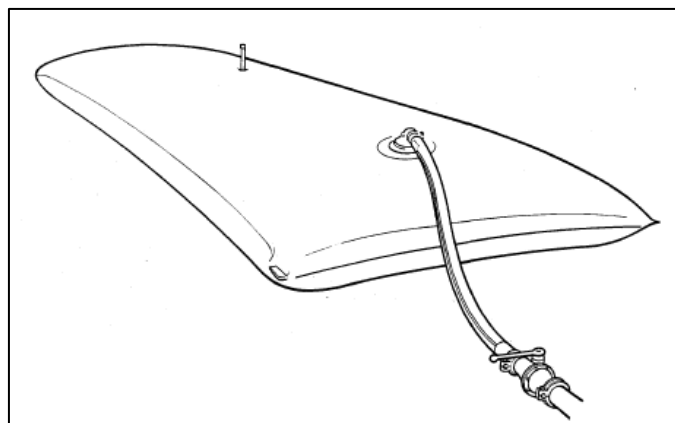


Figure 7.8 – Tank Fabric Collapsible.

755. **Constituent parts.** The TFC has 4" victaulic connections and a bottom drain.

756. **Size and transportation.** MHE is required for unloading whilst crated; otherwise unpacking, packing, and final positioning is done by hand.

757. **Construction and assembly.** It should be installed by trained personnel and must be placed on flat and level ground. If it is to hold fuel, it must be placed inside a bunded lined compound to avoid ground contamination.

758. **Other planning considerations.** For details of Bulk Fuel Installations (BFI) refer to ME Volume XII Chapter 17.

759. **Ordering information.**

a. **Equipment Manager.** BFU PT.

b. **NSN.**

5 m³: NP 5430-99-667-6883

10 m³: NP 5430-99-410-4288

45 m³: NP 5430-99-933-2886

136m³: NP 5430-99-930-2885

Utilities: power, water, fuel and waste

Lexicon

Part 1 – Glossary of terms

codification

The process by which a unique designation is assigned to a type of item in order to allow it to be entered into, and managed by, a Log IS.

communications infrastructure

The physical infrastructure required to facilitate communications and CIS, such as masts and towers.

domestic accommodation

Those items of infrastructure that are used to provide basic life support, for example, sleeping, cooking, dining, laundry, and fitness.

enabling contract

A standing commercial arrangement for the supply of goods and services.

not in vocab(ulary)

Not codified in a way that is recognised by the Log IS.

purple gate

The point of entry for material into the Joint Support Chain.

skeleton camp

A camp made from only normal GS tentage and little else.

skeleton camp plus

A skeleton camp with environmental control and associated electrical power.

technical accommodation

Those items of infrastructure that are used to provide facilities that enable command and control, Equipment Support (inspection and maintenance), materiel storage and processing, and other specialist functions. This includes: mobile headquarters, offices, workshops, aircraft shelters, detention facilities, and passenger handling.

Part 2 – List of abbreviations

ACU	Air-conditioning Unit
AES	Aircraft Environmental Shelters
ARB	Additional Resource Bid
BC	Business Case
BDRP/M	Bomb Damage Repair Patch/Mat
BFHU	Basic Field Hygiene Unit
BFI	Bulk Fuel Installation
BFU PT	Battlefield Utilities Project Team
BRG	Bullet Resistant Glazing
CARM	Chemical Agent Resistant Material
CHP	Combined Heating and Power
COTS/MOTS	Commercial-off-the-Shelf/Military-off-the-Shelf
D Jt Cap	Directorate of Joint Capability
DEW	Deployable Engineer Workshop
DMRS	Deployable Mechanical Repair Systems
DS&TE PT	Deployable Test and Support Equipment Project Team
DSCOM	Defence Supply Chain Operations and Movements
ECASS	Environmentally Controlled Ammunition Storage Shelter
ECI PT	Expeditionary Campaign Infrastructure Project Team
ECU	Environmental Control Unit
ELMC	Engineer Logistics Management Cell
ELPS	Engineer Logistics Policy Statement
EOI	Expression of Interest
	Expeditionary Protective Accommodation
EPAD/T	Domestic/Technical
EPW	Enhanced Protective Wall
ESS	Expeditionary Elevated Sangar
FEPDS	Field Electrical Power Distribution System
FEPS	Field Electrical Power System
FOWO	Force Ordnance Warrant Officer

HDPS	Heavy Duty Pump Set
HGOB	Heavy Girder Over Bridge
HLS	Helicopter Landing Site
ITC	Improved Tented Camp
ITT	Invitation to Tender
JSC	Joint Support Chain
LAPDS	Lighting and Power Distribution System
LBR	Lightweight Bunker Roof
LFG	Lightweight Field Generator
LOG IS	Logistic Information System
LSB	Logistic Support Bridge
LVO	Low Value Order
LVP	Low Value Purchase
MDPE	Medium Density Polyethylene
MDPS	Medium Duty Pump Set
MGOB	Medium Girder Over Bridge
MHE	Mechanical Handling Equipment
MLC	Military Load Classification
MS PT	Manoeuvre Support Project Team
NIV	Not in Vocab(ulary)
NSN	NATO Stock Number
NV	Norwegian Variant
OFCS	Operational Field Catering System
OIRR	Operational Infrastructure Recce Report
PPU	Pump Pressurisation Unit
REB	Rapid Erect Building
REH	Rapid Erect Hangar
RES	Rapid Erection Shelter

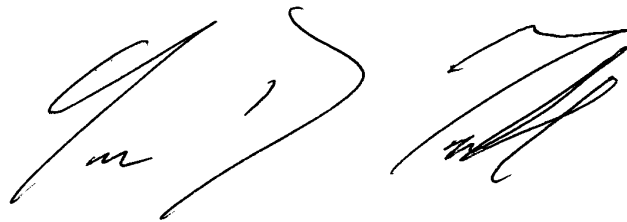
SCW	Single Container Workshop
SON	Statement of Need
SOR	Statement of Requirement
SUR	Statement of User Requirement
TBAU	Tactical Base Ablution Unit
TFC	Tank Fabric Collapsible
TIRR	Tactical Infrastructure Recce Report
USUR	Urgent Statement of User Requirement
WDTS	Water Development Task Stores
WPU	Water Purification Unit

JOINT TACTICS, TECHNIQUES AND PROCEDURES 4-05.2

(2nd Edition)

LANDS AND ENVIRONMENTAL PROCEDURES

Joint Tactics, Techniques and Procedures 4-05.2 (JTTP 4-05.2) (2nd Edition),
dated November 2012,
is promulgated
as directed by the Chiefs of Staff



Head of Doctrine, Air and Space (Developments, Concepts and Doctrine)

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Record of amendments

Amendment no.	Date of amendment	Initials

Preface

1. **Background.** Joint Tactics, Techniques and Procedures (JTTP) 4-05 *Operational Infrastructure* was first published in 2001. Unfortunately, none of the planned supporting sub-documents were subsequently published.

2. **Purpose.** The purpose of this sub-document to JTTP 4-05 is to set out the framework and give guidelines for the management of Lands and Environmental issues on the operational estate. JTTP 4-05.2 *Lands and Environmental Procedures* is one of several sub-documents that deal with specialist topics in the planning and delivery of infrastructure support on Operations.

3. **Scope.** This sub-document only addresses the Lands and Environmental issues pertinent to the operational estate as defined in the main document, JTTP 4-05 *Operational Infrastructure*. Extensive reference is made to JTTP 4-05 and it should be read alongside this sub-document.

a. **Lands issues.** Lands issues are:

- Assessment and selection of sites
- Acquisition of State and private property
- Requisitioning property during conflict
- Pre- and post-occupation surveys
- Lease interpretation, management and letting
- Planning control and rights over neighbouring land
- Site disposal

b. **Environmental issues.** Environmental issues are:

- Environmental land quality assessment
- Environmental stewardship
- Site remediation

4. **Target audience.** This publication is aimed at providing the guidance required by personnel responsible for:

- a. The planning of infrastructure support to operations.
- b. The delivery of infrastructure support in theatre.

Lands and Environmental Procedures

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Lexicon

Chapter 1 – The basics of operational land management

Section 1 – MOD policy and procedures

101. **MOD policy.** JSP 362 *Defence Lands Handbook* provides MOD policy for the management of Lands issues. Its focus is primarily on the UK estate and so is difficult to apply on the operational estate. The Secretary of State (SofS) for Defence's Policy Statement on Health, Safety, Environmental Protection and Sustainable Development sets out how UK rules and procedures should be applied to the operational estate. Part 3 of JTTP 4-05 *Operational Infrastructure* highlights the key principles within the policy statement and explains how they should be used to determine how, and to what extent, MOD rules and UK regulations should be applied on operations.

102. **Role of the Defence Infrastructure Organisation.** Defence Infrastructure Organisation (DIO) plays an important role in helping a deployed Force to address Lands and Environmental issues. Theatre or Permanent Joint Headquarters (PJHQ) may request that DIO subject matter experts deploy on a case-by-case basis to address specific issues.

a. **Defence Lands Agent.** All MOD leases, sub-leases, and licences should be taken out in the name of the Secretary of State (SofS), and only the Defence Land Agent (DLA) has authority to sign such documents on his behalf. No one else should enter into lease agreements, unless they are given a formal, written delegation from the DLA.

b. **Environmental Liability Management Group.** The Environmental Liability Management Group (ELMG) gives practical advice on the application of environmental policy. Through the production of a site-specific Land Quality Assessment (LQA), they are able to make an estimate of the environmental liability that we may face.

103. **Deploy the Defence Land Agent or obtain delegated powers.** The DLA should be deployed as early as possible. Where the DLA is deployed, only he is to undertake lease negotiations. Where the DLA is unable to

deploy, the DIO may authorise a suitably qualified and experienced person as the local Lands Officer to undertake lease negotiations on his behalf.¹

104. **Authority to Occupy a Location.** Before taking over a facility, building or land on which to build a base or facility, its ownership must first be established. However, this general principle does not withstand any operational imperative to move into a location and occupy it for a short period of time as an act of tactical manoeuvre. On operations, life should never be jeopardised by having to follow Lands and Environmental procedures.

Section 2 – Good governance

105. **Planning for the long-term.** Lands and Environmental issues take a long time to resolve. Early and sustained engagement by PJHQ and in-theatre staff is required if the operation is to draw to a close in good order. Measures taken by staff early in an operation to avoid problems will be appreciated by their successors.

106. **Continuity.** The subject matter experts (SMEs) within DIO provide a degree of continuity and level of familiarity with detail that is difficult to match in-theatre or at PJHQ. To make best use of these SMEs, they should be promptly informed of issues as they arise and every opportunity taken to ensure they remain familiar with the operational estate as it reshapes and evolves over the campaign. Periodic visits to address issues or make reports help ensure they remain current. They should be sent a copy of all relevant reports and assessments. Theirs is often the most complete repository of relevant information; it is an invaluable asset when the time comes to dispose of sites.

107. **Paying for rent and remediation.** Rent and remediation costs should be charged to the operation using Net Additional Costs of Military Operations (NACMO) as explained in Part 4 of JTTP 4-05. This requires the exercise of PJHQ's or theatre's financial delegation.

108. **Local laws.** In the early stages of an operation in an unfamiliar part of the world, the local land ownership and environmental protocols may not be immediately fully understood. It may take time to establish who has the

¹ This will normally be a CivSec Commercial Officer, but may be an appropriate military officer.

appropriate authority and what procedures we are obliged to follow. This should be addressed through a Status of Forces Agreement (SOFA) or a Memorandum of Understanding (MOU).

109. **Obtain a formal occupancy agreement before investment.** It is important to ensure that a formal agreement to occupy is entered into in order to secure legal rights of occupation for an appropriate period of time. Without an agreement in place, any infrastructure investment we make at a site may be wasted. A formal lease agreement also serves to define the respective rights and obligations of the landlord and tenant, and helps to avoid potential disputes in the future.

Chapter 2 – Assessment and acquisition

Section 1 – Site selection

201. **Factors considered when selecting a site.** The strategic and tactical requirements of the deployed Force are the overwhelming factors used to determine the sites over which it needs to secure tenure. However, Lands and Environmental factors should also be taken into account as they may have strategic or tactical implications. For example, the Force may need to take over a compound in a town in order to gain an operationally tactical advantage. However, if that location turns out to be private property or is needed for commercial regeneration, its continued occupation may run counter to the Force's strategic objectives of stabilisation.

202. **Value for money.** Where there is genuine choice, value for money must be considered.

203. **Preference for state-owned property.** Where possible, the Force should use state or publicly owned land in preference to private property. The rights to occupy these sites are usually defined a SOFA¹ or MOU. The benefits of occupying state or publicly owned property are:

- a. Greater security of tenure protecting investments in infrastructure.
- b. Generally there is no liability to pay a rent.
- c. Impact on the local community is minimised.
- d. Often the existing buildings, facilities and site layout are better suited to operational requirements.
- e. Should it prove necessary to expand, the state, or the local Public Authority with a controlling interest in the land, may be able to provide or assist in the acquisition of adjacent or nearby sites.

204. **Initial assessment.** Once site requirements have been defined, potential sites can be identified and compared. An initial assessment should

¹ Including in a UN Resolution or Regulation.

be undertaken of available sites for suitability, which will include site reconnaissance and the collation of basic information. Subsequently, a more detailed evaluation and comparative appraisal of the most suitable sites can be undertaken to determine the preferred option.

205. **Sources of site information.** Information on a site may be obtained from a number of sources:

- a. Central and local government departments (planning, building control, tax collection).
- b. Current and former owners/occupiers of the site.
- c. Adjacent owner/occupiers.
- d. International organisations, including coalition forces and non-government organisations (NGOs).
- e. Site reconnaissance.

206. **Detailed site assessment.** Once the most suitable sites have been identified, detailed infrastructure planning and costings must be undertaken to determine which is the most suitable. All the available information on a potential site should be gathered, to provide a complete picture. The following factors should be taken into account:

- a. Location and accessibility.
- b. Force protection requirements.
- c. Site ownership and potential liability for rent.
- d. Site area and configuration, including physical restrictions on use and development.
- e. Requirement of infrastructure works, including rough order of costs.

- f. Ground conditions, including topography, load-bearing capacity and drainage.
- g. Presence of any contamination, including pollution of ground or surface waters.
- h. Previous site uses, which may indicate potential for future development and/or the presence of contaminants.
- i. Suitability and condition of existing buildings and structures.
- j. Availability of services/utilities.
- k. Source and quality of water, where applicable.
- l. Adjacent uses and owner/occupiers: their potential to impact on-site use, and the potential offered for future site expansion and development.
- m. Restrictions imposed by planning legislation.
- n. Restrictions imposed by third party rights, including rights of way or rights to lay and maintain pipelines.
- o. Potential reinstatement costs.
- p. Impact on the local community and commerce.
- q. EOD assessment.
- r. Health and safety issues.²

² Specific areas of concern should be identified for appropriate action. These may include areas that require remedial works to prevent injury or fatalities, and areas of the site that are unsafe to enter and should be placed out of bounds.

Section 2 – The acquisition of state and publicly owned sites

207. **Overarching arrangements.** The rights to occupy state or publicly owned sites are ordinarily defined by reference to a Memorandum of Understanding, Technical Agreement (TA) or UN Resolutions and Regulations. Advice on existing arrangements and their terms and conditions should be obtained from the DLA, the in-theatre Civil Secretary (CivSec) or the Army Legal Services Advisor (LEGAD). In some cases it may be necessary to enter into subsidiary arrangements which confer permissions to occupy individual sites, particularly new or prospective acquisitions. Advice on the wording to be used in these agreements is to be obtained from the DLA or LEGAD.

208. **Agreements where no overarching arrangements are in place.** Where no overarching agreement is in place, the deployed Force may negotiate with the representatives of state or local Authority in order to reach agreement for use of their property. Negotiations should be conducted by the CivSec or the Senior Infrastructure Staff Officer in liaison with, and subject strictly to, the advice and guidance of the DLA and/or PJHQ. However, such negotiations may be conducted directly by the DLA, if deployed. In all cases, a written agreement should be entered into which clearly defines the terms and conditions of occupation. Advice on the wording to be used in such agreements is to be obtained from the DLA or LEGAD.

Section 3 – The acquisition of privately owned sites

209. **Getting it right.** Whilst the procedures detailed below may appear burdensome, bureaucratic or impractical, they are developed from lessons learnt on previous operations. On a number of occasions in the past, rents have been paid to other than the rightful owner and rents agreed at levels which proved subsequently to be well in excess of local norms. The procedures detailed have therefore been developed to attempt to avoid such mistakes on future operations, and should be applied to the greatest extent possible.

210. **Establishing ownership.** It is essential that legal ownership of a site is determined prior to entering into a formal lease agreement in order to ensure that the MOD does not pay rent to spurious claimants. However,

establishing ownership of property during, and immediately subsequent to, a conflict is extremely difficult and expert advice should be obtained from the DLA prior to acceptance of any claim. The following evidence should be obtained from the 'owner':

- a. A certified copy of a Land Registry Certificate (or equivalent) for the site, together with a copy of the Land Registry Plan (or equivalent) at, or close to, the date of occupation.
- b. Where a site is unregistered, or where a site is registered in the name of someone other than the claimant, it may also be necessary to obtain additional documentation issued at or close to the date of occupation. These could include a certified copy of the title deeds for the site, a contract for sale witnessed by the courts or a notary public, a court decision on inheritance, or a sworn and attested will and a power of attorney to represent the registered owner. Proof of identity should also be obtained.
- c. Where the above evidence is unavailable or inconclusive, copies of any planning consents, tax returns, utility bills or other documentation from statutory authorities, together with witness statements from neighbouring occupiers, should also be obtained. Reliance should not be placed on any one individual piece of evidence, and as much information as reasonably possible should be obtained.
- d. Where a property is alleged to be in a company's name, the 'owner' ought to provide a court certificate (or equivalent official document) confirming registration as a private trading company, a court certificate (or equivalent official document) confirming the identity of the director/authorised representative of the firm, and if appropriate, a certificate relating to the division of stock capital.

211. **Unsubstantiated claims.** Where claimants are unable to provide appropriate proof of ownership, claims should be rejected until such time as additional evidence becomes available.

212. **Entering into a lease.** It is essential that a formal agreement to occupy is entered into as soon as possible in order to secure legal rights of occupation for an appropriate period of time. Thus, operational capability and investments in infrastructure development will be protected. A formal lease agreement will also serve to formally define the respective rights and obligations of the landlord and tenant, and thus avoid potential disputes in the future.

213. **Authority to enter into leases.** All MOD leases and licences should be taken out in the name of the Secretary of State for Defence, and only the DLA has authority to sign such documents on his behalf. On no account should anyone else sign lease agreements, unless they are granted a formal written delegation by the DIO.

214. **Procedures during the early stages of an operation.** The DLA should be deployed as early as possible for an initial period, to be agreed between the deployed Force and the DIO. Where the DLA is deployed, only he is to undertake lease negotiations. Where the DLA is unable to deploy, the DIO may authorise a suitably qualified and experienced person to act as the local Lands Officer to undertake lease negotiations on his behalf.³

215. **Approvals process.** The authorised Lands Officer should provide the DLA with details of any property proposed for acquisition under lease, including general location details; plot size; use type; form and standards of construction of any buildings and structures, and their state of repair; number and size of rooms; and availability of services. Site and building plans should also be provided. In addition, the DLA should be supplied with copies of all ownership documentation, and, where appropriate, details of the proposed rent and lease terms for consideration and approval. In select circumstances, the DLA may also require costed details of any works required to the property for which the deployed Force will be responsible, and details of alternative properties available, together with reasons why these were rejected.

216. **Negotiations for lease.** Once the DLA has approved the proposed terms for lease, the authorised Lands Officer will enter into negotiations with the Landlord on rent and principle lease terms on a, without prejudice, basis

³ This will normally be a Civil Secretariat Commercial Officer, but may be an appropriate military officer.

and in consultation with the DLA. When appropriate terms have been agreed, the lease should be prepared in the model form as detailed below. The lease must then be signed by the landlord and sent to the DLA for signature on behalf of the Secretary of State.

217. **Model forms of lease.** Model forms of lease for use by authorised Lands Officers are attached at Annexes 2A and 2B, for green field sites and built sites respectively. Guidance on the terms and conditions of the model leases is also provided at Annex 2B to this Chapter. These model leases should be used at all times, without amendment save as indicated in the text; unless prior approval to modified terms and conditions has been obtained from the DLA.

218. **Full delegations.** In exceptional circumstances, the DIO may delegate, at its absolute discretion, the authority to sign leases to suitably qualified personnel within the Deployed Force. Authorised personnel will be required to provide a copy of any leases entered into as soon as practically possible after completion, together with details of the land and buildings under lease, and proof of ownership.

219. **Mature theatre.** Once the theatre is sufficiently mature, the DLA may be rear-based and lease negotiations may be undertaken by designated in-theatre personnel. Designated Officers must follow the procedures detailed in paragraphs 217 to 218. However, the DLA should deploy on a regular basis⁴ to undertake a review of land holdings, and in the interim will provide guidance and support on lands management matters as may be required.

220. **Rents.** Rental values are difficult to assess post-conflict as there are generally few, if any, property transactions from which to determine market values and trends. In such circumstances, DLA advice on appropriate levels of rent must be obtained prior to entering into any negotiations for lease.

⁴ This review should generally be undertaken at least twice a year.

Section 4 – The acquisition of sites from other government departments and coalition partners

221. **Agreements to occupy.** There may be circumstances where the deployed Force wishes to acquire the whole, or part, of a site from another UK government department, coalition force partner, or international organisation. Occupations of this nature may be governed by intra- or inter-governmental arrangements which may, or may not, require the parties to enter into subsidiary arrangements regarding the occupation of individual sites. Alternatively, rights to occupy may be obtained by way of a stand alone Memorandum of Understanding, or similar arrangement, or by a standard lease or licence agreement, as detailed at Paras 217 to 218, or Paras 306 and 307 of this JTTP.

222. **Seek advice.** Advice on existing arrangements – and the requirement for, and the form of, subsidiary or stand alone agreements – should be obtained from the CivSec, PJHQ J4 (HN) and/or the DLA.

Section 5 – Requisitioning sites during war

223. **Legal basis.** Rights to requisition and use enemy property during the occupation and direct control of enemy territory by a belligerent are described in Chapter 11 of JSP 383, *The Manual of the Law of Armed Conflict*.⁵ This is a complex area of law and it is therefore recommended strongly that advice is obtained from the DLA or the Army Legal Services Legal Advisor. To avoid any doubt, the belligerent occupation of enemy territory ceases when effective control transfers to a different authority, such that the territory ceases to be under the direct control of external military forces.

Private property

224. **Respect for private property.** Private property must be respected and cannot be requisitioned, without compensation. If personal property is requisitioned it must be paid for promptly, or a receipt given and the payment of the amount due shall be made as soon as possible. Private property can only be requisitioned for temporary use and where imperatively demanded by

⁵ See also the *Hague Regulations 1907, Arts 42-56, Geneva Convention IV 1949, Article 53 and the Additional Protocol I 1977.*

the necessities of war. Such requisitions must be proportionate to the resources of the country. Buildings may be used for the quartering of troops, the care of the wounded and sick, observation, reconnaissance, cover, and defence. Requisitions shall only be demanded on the authority of the Commander in the locality occupied.

225. **Quartering of troops.** When troops are quartered in private accommodation, some rooms should be left for the inhabitants, who should be evicted only if that is imperatively dictated by military necessity. In that event, some effort should be made to give the inhabitants notice and facilities for taking essential baggage with them. When unoccupied buildings are used, care should be taken of the structure and the internal fixtures and fittings.

Public property

226. **Military land and buildings.** Military land and buildings belonging to the State, such as supply depots, arsenals, dockyards, and barracks, airfields, ports, railways, canals, bridges, piers and their associated installations, remain at the disposal of the occupying power until the end of the conflict.

227. **Civilian land and buildings.** Land and buildings that belong to the State which are essentially civilian or non-military in character may also be requisitioned where necessary for military purposes. Such properties include public buildings, land, forests, parks, and farms.

228. **Role as administrator of land and buildings.** The occupying power acts as the administrator and, in a sense, guardian of buildings and land belonging to the hostile state. It must not waste, neglect, or abusively exploit these assets so as to decrease their value. The occupying power has no right of disposal or sale, but may let or use public land and buildings, sell crops, cut and sell timber, and work mines. It must not enter into commitments extending beyond the conclusion of the occupation of hostile territory, and the cutting of timber or mining of minerals must not exceed what is necessary or usual.

229. **Land and buildings of local authorities.** Exceptionally, the property of local authorities (including, for example, that of provincial, county and municipal authorities) is treated as if it were private.

230. **Religion, charity, education, art and science.** Buildings and land belonging to institutions dedicated to religion, charity, education, art and science are treated as private property, even if they belong to the State. Such forms of property may be requisitioned temporarily for humanitarian purposes, such as the care of the sick and wounded, if suitable alternative property cannot be found. Similarly, an occupying power may requisition civilian hospitals temporarily, but only in case of urgent necessity for the care of military wounded and sick, and then on the condition that arrangements are made for the treatment of the civilian population. Cultural property, including historic monuments, museums and libraries, are not to be used for military purposes.

231. **Destruction or damage of property.** The destruction or damage of real property belonging to private persons, the State, other public authorities, or social and cooperative organisations is forbidden, except where absolutely necessary for operational reasons. Extensive destruction and appropriation of real property, not justified by military operations and carried out unlawfully and wantonly, is a grave breach of the Geneva Conventions and thus a war crime. Destruction or damage of hospitals, places of worship and cultural property is forbidden.

Section 6 – Taking over a site

232. **Takeover Board.** A formal Takeover Board should be constituted to oversee the takeover of a site. The Board should be convened and led by the component Infrastructure Staff, where practicable. The DLA or authorised Lands Officer must attend the Board. Meetings with the owners, their representatives or agents and any agreements or understandings made between the parties, should be recorded and form part of the takeover procedure. The Board should draw on any detailed surveys and reports and focus on the overall decisions required: ensure surveys have been/will be conducted, determine whether areas should be out-of-bounds or impose any caveats on activities at the site. The Board's findings should be recorded using the format at Annex 4C of JTTP 4-05.

233. Pre-occupation Survey report. On, or before, taking over a new site from the owner/occupier, a pre-occupation survey must be carried out. The survey and report will establish the condition of the site before occupation and form the basis for determining the Force's maintenance and repair obligations during the period of occupation. The Infrastructure Staff should commission the survey, and report and facilitate it by gaining permission from the owner to enter the site. The site owner and Infrastructure Staff must both accept the report as a true record of the condition of the site on takeover. A copy of the report should be retained in theatre by the Facilities Manager (FM), and the original forwarded to the DLA for safe keeping together with all associated photographs. The format for a pre-occupation survey report is provided at Annex 2C.

234. Environmental Baseline Survey. Just like a pre-occupation survey, the Environmental Baseline Survey (EBS) must be carried out on, or before, takeover of a new site from the owner/occupier. The aim of the environmental baseline survey is to provide a baseline of the environmental condition of the site and identify any potential problems that could impact on human health,⁶ the environment, or cause damage to property belonging to another. The report will help determine what measures may be needed to protect the environment at the site. The environmental baseline survey is of crucial importance when handing back the site as it helps in the assessment of environmental liabilities and enables an informed decision on whether to mitigate, remediate, transfer or accept the liability posed to the environment. The Infrastructure Staff should commission the survey, and report and facilitate it by gaining permission from the owner to enter the site. The site owner and infrastructure staff must both accept the report as a true record of the condition of the site on takeover. A copy of the report should be retained in theatre by the Facilities Manager and the original forwarded to ELMG for safe keeping together with all associated photographs. The format for an environmental baseline survey is provided at Annex 2D.

235. Operational occupation. There may be cases when the deployed Force will have occupied sites at short notice during the conflict for operational reasons and may wish to remain. In these cases, the process of establishing ownership and lease negotiation should be carried out retrospectively, at the earliest opportunity. This process will also entail

⁶ Impact to human health could be in respect to the local community and or personnel deployed to the site.

Assessment and acquisition

completion of a pre-occupation survey, an environmental baseline survey and a Takeover Board.

Annex 2A – Model lease: Greenfield site

DATED _____ **20** _____

– to –

**THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM
OF GREAT BRITAIN AND NORTHERN IRELAND**

L E A S E

– of –

premises known as

THIS LEASE is made the.....day of..... Two thousand
.....**BETWEEN** (referred to in this lease as the "the Landlord")
and **THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED
KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND** (referred to in
this lease as "the Tenant").

THE PREMISES

1. Subject to the terms and conditions set out in this Lease, the Landlord leases to the Tenant all that property known as and situate at [*Provide full address and/or description, including grid coordinates*] and shown edged red on the attached plan entitled, dated (referred to in this lease as the "Premises")
TOGETHER with a right of passage at all times (with or without vehicles) between the Premises and the public highway **TOGETHER ALSO** the right to use maintain and repair all pipes, drains, channels, cables and wires which pass through the adjoining property of the Landlord

THE LENGTH OF LEASE

2. This Lease is for a period ofyears from the day of two thousand until the day of two thousand(referred in this lease as the "Term") unless terminated, extended or renewed by the Tenant in the manner set out below.

THE RENT

3. The Tenant agrees to pay a monthly rent of payable monthly in arrears. The first payment will be on the day of two thousand and then on theday of each and every calendar month during the tenancy.

Alternatively, this section can be replaced with the words, "The Premises will be made available free of charge save as otherwise provided below".

TENANT'S RIGHTS AND OBLIGATIONS

4. The Tenant agrees as follows:

- a. **Rent.** To pay the rent on the due days (*delete where applicable*).
- b. **Utilities.** To pay or reimburse the Landlord for all reasonable charges in respect of mains gas, electricity, water, sewerage and telephone lines which shall be consumed or supplied on or to the Premises during the Term.
- c. **Use.** Not to use the Premises for any use other than those associated with the mission of *[name of United Kingdom and/or International Force or Operation]* in *[name of country]* or such other use as the Landlord may approve in writing, such approval not to be unreasonably withheld or denied.
- d. **Alienation.** Not to sub-let or part with possession of the whole or part of the Premises without the previous consent in writing of the Landlord, such consent not to be unreasonably withheld or denied. **Provided** that no consent will be required for the occupation and use of the Premises or any part of it by the officers, servicemen, employees, agents, contractors or sub-contractors or invited guests of the Tenant or by the officers, servicemen, employees, agents, contractors or sub-contractors or invited guests of any United Kingdom Government Department or *[Name of International Force or Operation]* Troop Contributing Nations.
- e. **Rights of entry.** To permit the Landlord and his duly appointed agents to enter the Premises at reasonable times and on reasonable notice to inspect the condition of the Premises. **Provided** that if in the opinion of the Tenant, the security of the Premises or United Kingdom or *[Name of International Force or Operation]* operations may be jeopardised by granting the Landlord access at a certain time, the Tenant may at its absolute discretion deny the Landlord such access until such time as security is not threatened. **Provided also** that the Landlord shall use its best endeavours to minimise any disturbance

caused to the Tenant in the occupation and use of the demised premises.

f. **Hand back.** At the expiration or earlier determination of the Term to hand back the Premises in a clean and tidy state and otherwise as shall be in accordance with the terms and conditions contained in this Lease. **Excepting** that the Tenant shall not be liable to put the Premises into any better state of repair and condition than they were at the date of this lease **Excepting also** that the Tenant shall not be liable for making good or paying compensation to the Landlord in respect any damage caused by fair wear and tear or any damage arising therefrom, damage unavoidably caused in the course of operational activities pursuant to *[Name of Operation]* carrying out its mission, or damage or destruction arising from explosion, storm, tempest, flood, landslip, earthquake, aircraft or articles dropped therefrom, and any happening which is or could have been covered by a normal comprehensive insurance policy.

LANDLORD'S RIGHTS AND OBLIGATIONS

5. The Landlord agrees as follows;

a. **Quiet enjoyment.** To allow the Tenant to use the Premises exclusively and without interruption under the terms and conditions set out in this lease.

b. **Outgoings.** To pay and fully indemnify the Tenant against all taxes, duties, charges, assessments, and outgoings whatsoever (other than for the supply of gas, electricity, water, sewerage, and telephone lines) which shall be assessed, charged or imposed upon or payable in respect of the Premises or upon the owner or occupier of the Premises during the Term.

PROVISOS

6. The Landlord and Tenant agree as follows:

- a. **Tenants right to alter.** The Tenant may make such alterations or additions to the Premises as it sees fit during the term, including but not limited to the construction, installation, erection or demolition of permanent and temporary buildings or structures; service media (including but not limited to pipes, culverts, cables, and wires); telecommunications masts and towers; roads; pathways; hardstandings; security barricades and walls and fences. **Provided** that the Tenant shall not be required to reinstate the Premises to the state and condition they were in before any such alterations or additions were made **Excepting** that the Tenant will be permitted to remove any such temporary or semi-permanent alterations as he sees fit on expiry or earlier termination of the Term.
- b. **Tenants right to lay services.** The Tenant may lay, construct, maintain and use in, on or under the adjoining property of the Landlord such additional drains, pipes, cables and other services as are reasonably required for use of the Premises, with the right to enter upon the adjoining property of the Landlord on reasonable notice and to excavate therein or thereunder for any of the purposes aforesaid; the Tenant making good any damage thereby caused to the surface of the said land or to the said buildings.
- c. **Tenants right to extract water.** The Tenant may extract water from in on or under the Premises, in such quantities as it sees fit for the reasonable use of the officers, servicemen, employees, agents, contractors, sub-contractors, and invited guests of the Tenant, or by the officers, servicemen, employees, agents, contractors and sub-contractors, and invited guests of other United Kingdom Government Departments or *[Name of International Force or Operation]* Troop Contributing Nations and for which purpose the Tenant may drill, excavate construct or install any necessary boreholes wells pumps or associated apparatus as it sees fit.
- d. **Tenant's right to terminate.** The Tenant may terminate this Lease at any time upon giving the Landlord not less than 30 days Notice in writing for any reason whatsoever. No reason need be given. At the end of the Notice period this lease shall end but without prejudice to any rights or remedies which either the Landlord or Tenant may have

in respect of the terms and conditions contained in this Lease. Any rents paid for a period after the end of this Lease shall be reimbursed immediately to the Tenant.

e. **Tenant's right to renew.** The Tenant shall have the option to extend or renew this Lease for a further term of months from the expiration of the Term upon the same terms and conditions as are contained in this lease (including this option to renew). The Tenant shall notify the Landlord in writing of his intention to exercise such option not less than Thirty (30) days prior to expiry of the term.

f. **Interpretation.** It is the intention of the parties that this Lease be subject to English law. It is further intended that the English language version of this Lease and any other language into which it shall be translated shall have identical meaning. In the event of any conflict between the two versions the English language version shall take precedence.

g. **Notices.** Any Notice required to be given under this Lease shall be in writing and any Notice to the Tenant shall be addressed to and be left at or sent by registered or recorded delivery post to **THE DEFENCE LAND AGENT, HQ, BRITISH FORCES POST OFFICE** and any Notice to the Landlord shall be addressed to and be left at or sent by registered or recorded delivery post to..... A Notice sent by post shall be deemed to be given at the time when it ought in due course of post to be delivered at the address to which it is sent.

h. **Ownership.** The Landlord warrants that he is the rightful owner of the Premises and has the right to enter into this Lease. If the title of the Landlord shall fail or if it is discovered that the Landlord did not have sufficient rights to lease the Premises, this Lease shall immediately terminate. The Landlord agrees to indemnify the Tenant by reason of such failure and to refund all rents paid under the Lease.

The parties record their agreement to the terms and conditions of this Lease by signing below:

SIGNED by the said Landlord **[STATE NAME]**:

in the presence of:

Signature of Witness:

Name:

Address:

SIGNED by **[STATE NAME]**: **THE DEFENCE LAND AGENT**

for and on behalf of the said Tenant **THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND**

in the presence of:

Signature of Witness:

Name:

Address:

Annex 2B – Model lease: Built property

DATED _____ **20** _____

– to –

**THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM
OF GREAT BRITAIN AND NORTHERN IRELAND**

L E A S E

– of –

premises known as

THIS LEASE is made the.....day of..... Two thousand
.....**BETWEEN** (referred to in this lease as the "the Landlord")
and **THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED
KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND** (referred to in
this lease as "the Tenant").

THE PREMISES

1. Subject to the terms and conditions set out in this Lease, the Landlord leases to the Tenant all that property known as and situate at [*Provide full address and/or description, including grid coordinates*] and shown edged red on the attached plan entitled, dated **TOGETHER** with all buildings, structures and Landlords fixtures and fittings thereon and therein (referred to in this lease as the "Premises") **TOGETHER ALSO** with a right of passage at all times (with or without vehicles) between the demised premises and the public highway **AND** the right to use maintain and repair all pipes, drains, channels, cables and wires which pass through the adjoining property of the Landlord

THE LENGTH OF LEASE

2. This Lease is for a period ofyears from the day of two thousand until the day of two thousand(referred in this lease as the "Term") unless terminated, extended or renewed by the Tenant in the manner set out below.

THE RENT

3. The Tenant agrees to pay a monthly rent of payable monthly in arrears. The first payment will be on the day of two thousand and then on theday of each and every calendar month during the tenancy.

Alternatively, this section can be replaced with the words, "The Premises will be made available free of charge save as otherwise provided below".

TENANT'S RIGHTS AND OBLIGATIONS

4. The Tenant agrees as follows:

- a. **Rent.** To pay the rent on the due days(*delete where applicable*).
- b. **Utilities.** To pay or reimburse the Landlord for all reasonable charges in respect of mains gas, electricity, water, sewerage and telephone lines which shall be consumed or supplied on or to the Premises during the Term.
- c. **Repairs.** To keep the whole of the Premises in good repair (*alternatively, liability could be amended 'To keep the interior of the Premises in good repair'*) during the Term Excepting that the Tenant shall not be liable to put the Premises into any better state of repair and condition than they were at the date of this Lease Excepting also that the Tenant shall not be liable for making good or paying compensation to the Landlord in respect of fair wear and tear and any damage arising from it, any damage unavoidably caused in the course of operational activities in connection with [*Name of Operation*], any damage arising from faults in the design or construction of the Premises, any damage caused by the Landlord's failure to repair and maintain the Premises in accordance with Clause 5(b) of this Lease, and destruction or damage arising from fire, explosion, storm, tempest, flood, earthquake, aircraft or articles dropped there them, and any happening which is, or could have been, covered by a normal comprehensive insurance policy.
- d. **Use.** Not to use the Premises for any use other than those associated with the mission of [*name of United Kingdom and/or International Force or Operation*] in [*name of country*] or such other use as the Landlord may approve in writing, such approval not to be unreasonably withheld or denied.
- e. **Alienation.** Not to sub-let or part with possession of the whole or part of the Premises without the previous consent in writing of the Landlord, such consent not to be unreasonably withheld or denied. Provided that no consent will be required for the occupation and use of the Premises or any part of it by the officers, servicemen, employees,

agents, contractors or sub-contractors or invited guests of the Tenant or by the officers, servicemen, employees, agents, contractors or sub-contractors or invited guests of any United Kingdom Government Department or *[Name of International Force or Operation]* Troop Contributing Nations.

f. **Rights of entry.** To permit the Landlord and his duly appointed agents to enter the Premises at reasonable times and on reasonable notice to inspect the condition of the Premises. **Provided** that if in the opinion of the Tenant, the security of the Premises or United Kingdom or *[Name of International Force or Operation]* operations may be jeopardised by granting the Landlord access at a certain time, the Tenant may at its absolute discretion deny the Landlord such access until such time as security is not threatened. **Provided also** that the Landlord shall use its best endeavours to minimise any disturbance caused to the Tenant in the occupation and use of the demised premises.

g. **Hand back.** At the expiration or earlier determination of the Term to hand back the Premises and the Landlord's fixtures and fittings in or upon the Premises in such repair as shall be in accordance with the terms and conditions contained in this Lease.

LANDLORD'S RIGHTS AND OBLIGATIONS

5. The Landlord agrees as follows:

a. **Quiet enjoyment.** To allow the Tenant to use the Premises exclusively and without interruption under the terms and conditions set out in this Lease.

b. **Repair.** To maintain and keep the external and structural elements of the Premises in good repair and condition and to repair, rebuild, replace and renew where necessary:

(1) All external and load bearing walls (including wall surfaces and plasterwork), beams, columns, floors, foundations, staircases, window frames and glazing, external doors and door

frames, and roofs of any buildings and structures on the Premises and their drains, gutters and rain water pipes.

(2) All service media available for use by the Tenant, including, but not limited to all water, sanitation, ventilation, central heating and air-conditioning plant and equipment, tanks, electrical wiring, pipes, conduits, cables, and other Landlord's fixtures and fittings upon, under or within the Premises.

(3) All external decorations.

(4) All parts of the Premises shared with the Landlord, another Tenant, or any other authorised person (including but not limited to all floorings, ceilings, partitions, surfaces, finishes, doors, windows, framework, fixtures, and fittings and other parts thereof).

(5) All roadways, footpaths, hardstandings, gardens, and grassed areas, boundary walls and fences and any common areas.

Excepting that the Landlord will not be responsible for the repair and maintenance of any buildings, structures, or service media erected or installed by, and for the exclusive use of, the Tenant.

(Where it has been accepted that the Tenant will be responsible for repairing the whole of the Premises, the above clause should be deleted)

c. **Outgoings.** To pay and fully indemnify the Tenant against all taxes, duties, charges, insurance premiums, assessments, and outgoing whatsoever (other than for the supply of gas, electricity, water, sewerage, and telephone lines) which shall be assessed, charged or imposed upon or payable in respect of the Premises or upon the owner or occupier of the Premises during the Term.

d. **Insurance.**

(1) To insure and keep insured in the joint names of the Landlord and Tenant all permanent buildings and structures on the Premises to their full reinstatement value, together with professional fees and the cost of site clearance, with a reputable insurance office or underwriters, against loss or damage by fire, explosion, storm, tempest, flood, earthquake, aircraft and articles dropped therefrom, and against third party liability, public liability and property owners liability, and any other risks normally covered by a comprehensive insurance policy.

(2) To ensure that each policy of such insurance shall contain an endorsement providing that there shall be no claim against the Tenant, his officers and employees, and others occupying the Premises or acting on his behalf for any loss damage or injury within the scope of the insurance.

(3) To produce a copy of the policy or policies and the receipt of the latest premium to the Tenant on demand.

(4) In the event of damage or destruction of any buildings or structures on the Premises due to any of the insured risks to spend all monies which shall be paid by such insurance office or underwriters for the said buildings or structures (other than monies received in respect of third party, public or property owners liability) in rebuilding or otherwise reinstating with all reasonable speed such buildings or structures.

[It is accepted that effective insurances may be difficult or impossible to obtain in areas of conflict, in which circumstances, this clause may be varied or deleted in its entirety as appropriate].

PROVISOS

6. The Landlord and Tenant agree as follows:

a. **Tenant's power to do works.** If the Landlord fails to comply with his obligations for repair during the Term, the Tenant may serve on the Landlord a written Notice specifying the defects and necessary repairs and requiring the Landlord to immediately carry out such works. If the Landlord fails to carry out the works within 14 days after service of such Notice the Tenant may carry out the works and recover the full costs (including but not limited to, all legal costs, surveyors', architects', and other professional fees) by deduction from future payments of rent.

[Where it has been accepted that the Tenant will be responsible for repairing the whole of the Premises, the above clause should be deleted]

b. **Tenant's right to alter.** The Tenant may make such alterations or additions to the Premises as it sees fit during the term, including but not limited to the construction, installation, erection or demolition of permanent and temporary buildings or structures; service media (including but not limited to pipes, culverts, cables, and wires); telecommunications masts and towers; roads; pathways; hardstandings; security barricades and walls and fences. **Provided** that the Tenant shall not be required to reinstate the Premises to the state and condition they were in before any such alterations or additions were made **Excepting** that the Tenant will be permitted to remove any such temporary or semi-permanent alterations as he sees fit on expiry or earlier termination of the Term.

c. **Tenant's right to lay services.** The Tenant may lay, construct, maintain and use in, on or under the adjoining property of the Landlord such additional drains, pipes, cables and other services as are reasonably required for use of the Premises, with the right to enter upon the adjoining property of the Landlord on reasonable notice and to excavate therein or thereunder for any of the purposes aforesaid; the Tenant making good any damage thereby caused to the surface of the said land or to the said buildings.

d. **Tenant's right to extract water.** The Tenant may extract water from in on or under the Premises, in such quantities as it sees fit for the reasonable use of the officers, servicemen, employees, agents, contractors, sub-contractors, and invited guests of the Tenant, or by the officers, servicemen, employees, agents, contractors and sub-contractors, and invited guests of other United Kingdom Government Departments or *[Name of International Force or Operation]* Troop Contributing Nations and for which purpose the Tenant may drill, excavate construct or install any necessary boreholes wells pumps or associated apparatus as it sees fit.

e. **Tenant's right to terminate.** The Tenant may terminate this Lease at any time upon giving the Landlord not less than 30 days Notice in writing for any reason whatsoever. No reason need be given. At the end of the Notice period this lease shall end but without prejudice to any rights or remedies which either the Landlord or Tenant may have in respect of the terms and conditions contained in this Lease. Any rents paid for a period after the end of this Lease shall be reimbursed immediately to the Tenant.

f. **Tenant's right to renew.** The Tenant shall have the option to extend or renew this Lease for a further term of months from the expiration of the Term upon the same terms and conditions as are contained in this lease (including this option to renew). The Tenant shall notify the Landlord in writing of his intention to exercise such option not less than Thirty (30) days prior to expiry of the term.

g. **Interpretation.** It is the intention of the parties that this Lease be subject to English law. It is further intended that the English language version of this Lease and any other language into which it shall be translated shall have identical meaning. In the event of any conflict between the two versions the English language version shall take precedence.

h. **Notices.** Any Notice required to be given under this Lease shall be in writing and any Notice to the Tenant shall be addressed to and be left at or sent by registered or recorded delivery post to **THE DEFENCE LAND AGENT, HQ, BRITISH FORCES POST OFFICE**

..... and any Notice to the Landlord shall be addressed to and be left at or sent by registered or recorded delivery post to..... A Notice sent by post shall be deemed to be given at the time when it ought in due course of post to be delivered at the address to which it is sent.

i. **Ownership.** The Landlord warrants that he is the rightful owner of the Premises and has the right to enter into this Lease. If the title of the Landlord shall fail or if it is discovered that the Landlord did not have sufficient rights to lease the Premises, this Lease shall immediately terminate. The Landlord agrees to indemnify the Tenant by reason of such failure and to refund all rents paid under the Lease.

The parties record their agreement to the terms and conditions of this Lease by signing below:

SIGNED by the said Landlord [*STATE NAME*]:

in the presence of:

Signature of Witness:

Name:

Address:

SIGNED by *[STATE NAME]*: **THE DEFENCE LAND AGENT**

for and on behalf of the said Tenant **THE SECRETARY OF STATE FOR
DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND
NORTHERN IRELAND**

in the presence of:

Signature of Witness:

Name:

Address:

Lease guidance notes

1. A formal lease for a fixed period is essentially a contract which creates an interest in land and which contains a number of covenants (terms) that defines the respective rights and obligations of the landlord and tenant.
2. Advice and guidance on the principle terms of a lease are provided below.

The length of lease

3. The lease period should be agreed by reference to the operational mandate and the requirements of the mission. Subject to these limitations, terms of three to five years are preferable, subject to appropriate rights to terminate in favour of the tenant. However, the recommendations of the DLA are to be obtained prior to formalising any agreement.

The rent

4. The lease should clearly state the rent, the payment dates and the rent commencement date. Rent should be paid monthly or quarterly in arrears, as provided for under the terms of the model lease. Requests by the landlord for the MOD to pay rent in advance should only be acceded to if the hiring is demonstrably good value for money and no suitable alternative is available. Requests for the MOD to pay a whole year's rent in advance are not to be agreed to under any circumstances.

Liability for repairs and damages

5. A repairing covenant may be expressed in a variety of ways, the parties being free to agree whatever terms they wish within the constraints of applicable law. However, many landlords will seek to impose full obligations for repair on the tenant.
6. The following should be considered in deciding upon the repairing basis to be adopted:

- a. Security requirements may limit areas of the site and certain buildings which the landlord may be allowed to enter, and so restrict his ability to undertake maintenance work and repairs.
- b. Accepting liability for repairs can ensure greater control over the standard of maintenance and repair works. Furthermore, by accepting liability for repairs, the tenant may have more control over the speed of response (particularly important with regard to urgent repairs).
- c. Accepting liability for repairs may be preferable where it can be seen that the landlord has limited funds or capacity to meet the requirement, or where local building standards are low.
- d. In general, the rent for a site is likely to increase to reflect the landlord's acceptance of an obligation to repair.

Conversely:

- a. The rent for a lease requiring the tenant to undertake internal repairs only may prove more cost-effective than one imposing liability for all repairs, particularly on older, more complex properties, or those in disrepair.
 - b. A lease requiring the tenant to conduct all repairs will place an added burden on the Joint Task Force (JTF); a burden which may be particularly onerous in respect of complex properties, such as large factories, buildings of poor design and construction, and those in disrepair.
7. Clearly then, there may be instances where a full repairing liability is preferable, whilst in others, liability would be better restricted to internal repairs only.
8. The model lease for built property is written on the basis of the JTF accepting liability for all repairs, although alternative wording is provided by which liability for external and structural repairs is transferred to the landlord. However, there are particular exceptions to this general obligation, which the JTF should seek to include in all lease agreements. These include:

- a. The tenant should not be required to put the premises in a better state than they were in at the start of the lease and as evidenced by the pre-occupation survey report. This exception is essential in providing a base line by which the repairing obligations of the JTF will be defined, and therefore limiting liability for any damages at the end of the lease.
- b. The tenant is not liable for fair wear and tear, which is defined as general deterioration over time caused by accepted normal usage.
- c. The tenant is not liable for damage caused by the landlord's failure to repair and maintain the premises in accordance with his lease obligations (including fair wear and tear). This could include, for example, damage to internal plasterwork and wall coverings resulting from a defect to roof coverings for which the landlord is responsible. However, the JTF must act to mitigate its own losses by notifying the landlord of any damage for which he is responsible and which could lead to additional problems, as soon as reasonably practical, after becoming aware of the problem. Failure to do so could result in the JTF assuming liability for any additional damage arising from the initial disrepair.
- d. The model lease also provides that the tenant is not required to repair damage unavoidably caused during the course of the JTF's operational activities. This provides the MOD with a basis for defence of claims in respect of various types of damage, including, for example:
 - (1) Damage caused by increased intensity of use necessary to meet operational objectives.
 - (2) Unavoidable damage to road surfaces by tracked vehicles.
 - (3) Unavoidable damage to roof coverings during installation and removal of essential communications equipment.
- e. The JTF must be able to demonstrate that the activity resulting in damage was necessary and the damage unavoidable, rather than mere carelessness on the part of the occupying unit.

f. The tenant should not be responsible for damage or destruction arising from an insured risk, where the landlord is able to obtain a settlement from his insurers.

9. Where the above exceptions are incorporated into a lease agreement, the tenant's responsibilities are effectively restricted to negligent and wilful damage.

Tenant's ability to carry out works in default of the landlord

10. There may be instances where a landlord fails to carry out repairs for which he is expressly responsible, whether due to lack of funds or otherwise. Accordingly, it is essential that the JTF have the right to carry out essential repair in default of the landlord, and to reclaim the cost of such as a debt or by deduction from succeeding rents. Such a clause is included in the model lease.

11. In all cases, other than in emergency, the landlord should be notified in writing of the defects and given a reasonable period in which to carry out the necessary works.

Tenant's ability to carry out alterations and improvements

12. In order to provide maximum flexibility, the model lease provides that the tenant may make any such alterations or additions to the demised premises as he sees fit without the need to obtain the landlord's consent. However, the landlord may wish to retain some control, at least over permanent alterations and improvements, and it may be necessary to amend the model lease accordingly. A suggested form of words is as follows:

'Not to make any permanent alterations or additions to the Premises without the previous consent in writing of the landlord, such consent not to be unreasonably withheld or delayed. Provided that no consent shall be needed for the installation or erection of any temporary or semi-permanent buildings or structures; service media (including but not limited to pipes, culverts, cables, and wires); telecommunications masts and towers; roads; pathways; hardstandings; security barricades; and walls and fences'

13. Clearly this limits the rights of the JTF to undertake permanent alterations without having obtained the landlord's consent. However, as it is expressly stated that the landlord's consent cannot be unreasonably delayed or denied, permission can only be refused in certain circumstances. For example, if the proposed works would diminish the value of the premises or have a significant detrimental effect on other property in his ownership. This proviso will also prevent the landlord from making capital from the grant of his permission by seeking a monetary payment or other benefit.

14. Some landlord's will seek a reinstatement clause, whereby the tenant will be required to reinstate the premises to the state and condition they were in before any alterations or additions were made. Needless to say this should be resisted as it could result in some expense to the MOD. The model lease therefore provides that the tenant will not be required to reinstate.

Tenant's right to extract water

15. The model lease provides for rights for the tenant to extract water from in on or under the premises, in such quantities as it sees fit for its reasonable use.

Landlord's rights of entry

16. Where the landlord has obligations to undertake repair and maintenance work, it is essential that he be granted rights of access to the property at reasonable times. The model lease provides such rights although these are limited by requirements to minimise disturbance to the tenant and the right to refuse entry for security reasons.

Rights to transfer possession of the premises to another troop contributing nation on multinational operations

17. The JTF will frequently deploy as part of an international force and it is therefore advantageous to have a right to assign possession of leased property to the armed forces of another Troop Contributing Nation (TCN). This is particularly important as responsibility for geographical areas of operations may change over time. The model lease therefore contains a

provision that an assignment to another TCN is permitted without the landlord's consent. The model lease allows the JTF to sublet to, or share possession of, the demised property with the armed forces of other TCNs, without the landlords consent.

18. The permitted user is also broadly defined to allow any use associated with the mission of the international force.

Rights to sub-let, or share occupation of part

19. There will be occasions where the JTF wish to sub-let to, or share possession of part of a leased site with, contractors and commercial service providers or welfare organisations. The model lease therefore makes provision for the JTF to grant such sub-lettings without the landlord's consent. The permitted user is broadly defined to allow any use associated with the mission of the UK or the international force of which it forms part.

20. All other assignments will require the landlord's consent, which is not to be unreasonably withheld or delayed.

Liability for insuring the premises

21. Under the terms of the model lease, the landlord is held liable for insuring the premises. The type of insurance to be taken out is expressly defined and must be effected to the benefit of the tenant, as well as the landlord. This is to ensure that the insurance company does not make a claim against the tenant or his employees, where damage or loss is attributable to their negligence. Monies paid out by the insurers must be used to rebuild or reinstate damaged or destroyed buildings or structures.

22. However, it may prove difficult if not impossible to obtain insurance within an operational area. In such circumstances, this clause may be modified or deleted in its entirety, although appropriate advice must be obtained from the DLA or Army Legal Services Advisor before any such variation is agreed with the landlord.

Options to terminate or renew the lease

23. It is not always possible to accurately predict how long a property will be required on deployed operations. Accordingly, it is essential that all leases contain a provision by which the tenant may terminate the lease at short notice. Such a provision is incorporated into the model lease.

24. It follows that the JTF will also benefit from a right to renew the lease for a period. Accordingly, such an option is incorporated into the model lease.

25. Where the pre-existing buildings or structures are destroyed or damaged as a result of various happenings, whether wholly or in part, it is essential that the JTF has the right to determine the lease and/or reduce the rent dependent upon the circumstances involved. Such a provision is incorporated into the model lease for built property.

Quiet enjoyment

26. Under the terms of the model leases, the landlord must allow the tenant to use the property without disturbance or hindrance. For example, he cannot prevent access nor can he use adjoining land or permit the use of adjoining land for a purpose, which renders the demised premises useless for the tenant's purpose or detracts from its value. To do so would be a derogation from grant.

Rent reviews

27. If it can be avoided, it is obviously preferable not to include provision for rent review in leases. However, where landlords insist on periodic review one will need to agree an appropriate clause, stipulating the basis for determining the revised rent and, of course, the dates of the reviews. An appropriate form of words should be obtained from the DLA.

Annex 2C – Pre-occupation survey report

Report reference N°:			
Video reference N°:			
Photograph reference N°:			
Site location/address:			
Map sheet title:	Sheet N°:	Map series:	Site grid reference:
Occupying unit:			
Date of occupation:			
Date of survey:			
Name and Unit of Surveyor:			

Owners identity:
Owner's Address, and Telephone N°:
Lease reference N°:
Lease commencement date:

General description of the site and facilities, including buildings, structures and service utilities.
--

Historical information concerning the site.

Detailed description of all existing damage.		
Element	Description	Condition
<i>External</i>		
Structure		
Roof		
Roof drainage		
Decoration		
Doors		
Windows		
Ancillary buildings and structures		
Site works and landscaping		
Lighting		
<i>Internal</i>		
Floors		
Walls		
Ceilings		
Doors		
Lighting		
Decoration		
Electrical installations		
<i>Room number</i>		
1		
<u>Meter readings</u>		
Electricity:		
Water:		
Gas:		

Environmental base line survey report reference N ^o and date:
Other reports reference N ^o and dates. <i>(if applicable) – State type of report e.g. Structural survey etc.</i>

Pre-occupation survey report guidance notes

Site location

1. Grid coordinates should be provided together with a postal address, where available. A location plan should also be provided.

General description of the site

2. A brief written summary should be made of all buildings, structures and facilities, and site and building plans provided.

Historical information concerning the site

3. If possible, identify any previous uses of the site, including type of use and duration, and the identity of the occupier.

Condition of the site and facilities

4. A detailed written record of all damage should be produced on a structure-by-structure, room-by-room basis.

5. A photographic record should be also be taken of the entire site, including all structures, facilities, buildings (external and internal, room-by-room) and fixtures and fittings. Existing damage should be clearly identifiable and referenced to available plans and drawings, upon which the location of any damage should be recorded.

6. Where appropriate, an inventory of contents should be taken (for example, carpets, curtains, and furniture) and the condition of such contents noted.

7. Meters for utilities, for which a bill may be raised, should be read and the reading recorded.

8. Any environmental damage should be recorded on the environmental baseline survey report, attached as Annex 2D.

9. **The site.** The condition of the following site features should be included where appropriate:

- Roads and paths.
- Hard standings and vehicle parking areas.
- Grassed areas and fields.
- Boundary fences, walls and retaining walls.
- Bridges (road, rail and foot).
- Dams and water retaining structures.
- Railways and tramlines.
- Mature trees and roots.
- Watercourses, such as rivers, streams and springs, and the potential for flooding within the site (including adjacent sites).
- Any other structure contained within the site.

10. **Services and utilities.** A record of the general condition of any site services and utilities is to be made, including:

- Electrical supply and distribution, including street lighting.
- Water supply and distribution.
- Gas supply and distribution.
- Drainage or sewerage systems¹ (these may require a specialist video survey) including open channels, culverts and the like.

¹ Including any cess pits, septic tanks, treatment plant or similar.

11. **Buildings and structures.** The condition of the following should be noted:

a. **Externally to buildings.**

- General structural stability and integrity of all load-bearing elements of the building and structure, noting any deflection, bowing, defects or settlement.
- Chimney stacks, flashings and soakers, as observed from the ground and/or the roof, if practicable.
- Roofs, with attention being drawn to roof slopes or flat areas.
- Parapets and valley gutters.
- Gutters, downpipes, gullies and other rainwater goods.
- Main walls (examined from ground level), including render, brickwork bonding, abutments and returns.
- Damp-proof courses and sub-floor ventilation.
- External joinery, including window and doorframes, examined as far as possible.
- Exterior decorations and paintwork.

b. **Internally to buildings.**

- Ceilings, walls and partitions, inspected from floor level (including their structural integrity).
- Fireplaces, flues and chimney breasts (including their structural integrity).
- Floor finishes.
- Roof spaces, where accessible.
- Dampness to walls, floors and ceilings.

- Internal joinery, including doors, staircases and built-in fittings.
- Internal decorations.
- Cellars and vaults.
- Woodworm, dry rot and other timber defects.
- Electrical installation and distribution inspection, and test as required.
- Gas (if connected).
- Sanitation (including fittings).
- Water and plumbing.
- Hot water and central heating.
- Internal fixtures and fittings (including furnishings if present).

Signatories

12. The survey report should be signed by the site owner and a designated representative of the deployed Force as representing a true and faithful record of the condition of the premises as at the date of survey. The survey will thus form part of the lease or other occupational agreement, and provide a basis for determining obligations for repair during the deployed Force's period of tenure.

Distribution

13. The survey report should be distributed to all relevant parties including:
- HQ Infrastructure Staff.
 - The Defence Land Agent
 - Theatre/component CivSec (Commercial).
 - The site owner.

Annex 2D – Environmental baseline survey report

Unit Ref:
Infra Task No:

Section 1: Details of the site	
Mission/Operation:	
Site location: (Map sheet, grid reference):	
Site address:	
Date of occupation:	
Date of EBS:	
Name and contact details of person carrying out the EBS:	

Section 2: Site records	
Pre-occupation survey:	
Any interim data gathering survey:	
Other reports:	
Site plan:	

Photographic record:	
Brief pertinent historical information concerning the site:	

Section 3: Land use	
General site setting	
Fuel storage and handling	
Explosive ordnance use and storage	
Waste treatment storage and disposal	
Radioactivity	
Asbestos	
Hazardous Chemicals (HAZMAT)	

Burning grounds	
Vehicle maintenance and wash-down	
Details of workers interviewed in order to obtain this information:	

Section 4: Environmental setting

Section 5: Cultural and social

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Section 6: Ecology

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Section 7: Local community and practices

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Environmental baseline survey guidance notes

Section 1: Details of the site

1. Grid coordinates should be provided together with a postal address, where available. A location plan should also be provided. Alternative and/or previous site names should also be recorded.

Section 2: Site records

2. The report should make reference to any general pre-occupation survey and any other interim data-gathering surveys.

3. The site location plan should be of a sufficient scale to be able to locate the base from surrounding towns. The site plan should clearly identify the base boundaries, the current site layout, including buildings and assets, and any relevant off-site features, for example, water features. For larger and/or more complex bases it may be more appropriate to submit several smaller plans (as well as an overall site plan) to allow clear identification of buildings and assets.

4. Photographs should be representative of the area of the base and surroundings. They should include the features and activities identified in further Sections of the EBS.

5. Photographs should clearly show any areas of contamination, current or historic spillage, pollution, or damage, along with high-valued assets.

Section 3: Land use

6. The sub-sections in this part of the report enable information to be collected into specific categories/areas. Whilst specific categories have been identified, these are not restrictive, and additional comments and observations should be included where appropriate. In addition, the assessor is encouraged to append other sources of information that may be regarded as appropriate, for example, borehole records, water quality data, and previous investigation surveys. Furthermore, not all the categories will

necessarily be applicable to every location: state either *Not observed* or *Not applicable* where this is the case. In all cases be as specific as possible.

7. The General Site Setting should include, but not be restricted to, the following:

- a. Whether the site was visually observed or identified from interviews, record reviews, or maps, for example.
- b. The current uses of the site and buildings, description of structures, size, basic construction type, number of stories and approximate age.
- c. The roads, streets, parking areas, public thoroughfares and walkways.

8. Fuel storage and handling should include, but not be restricted to, the following:

- a. Types of fuel being stored and other products, such as, coolant, anti freeze, used oil and batteries.
- b. How the fuel is being stored, in above and/or below ground tanks, their condition, volumes of fuel being stored, bunding, drainage around any storage, and the presence of interceptors.
- c. The presence of ground stains around filling and/or dispensing points, and around tanks and drums.
- d. If drums are present, what is their condition? Are they on drip trays or bunded areas? What do they contain?

9. The sub-section on waste should include:

- a. Description of the utilities layout.
- b. Description of any sewage system on the site, including treatment and disposal processes and their general condition.

- c. List the presence, number and condition of manholes, cess pits, borrow pits, desert roses and interceptors.
 - d. Describe any filled, open, graded or mounded areas that would indicate waste disposal has been occurring. If waste is visible make a note of the type and volume of material that is present.
10. The sub-section on radioactivity should confirm the presence of radioactive materials, for example, warning signs, or luminised equipment.
11. The presence of asbestos should also be noted. Describe the location, condition and quantities of any asbestos and/or asbestos-containing materials. ***Do not attempt to disturb these materials without seeking professional advice.***
12. Hazardous Chemicals (HAZMAT): description should include, but not be restricted to, the following:
- a. Describe all products, type, amount and condition of storage (cross reference can be made with fuel storage).
 - b. Note any unidentified substance containers, their location, and describe condition of storage.
 - c. Note any staining of the ground around containers or storage facilities for HAZMAT.
 - d. Include a description of any electrical or hydraulic equipment likely to contain Polychlorinated Biphenyls (PCBs).
13. Burning grounds: description should include but not be restricted to the following:
- a. Describe and identify on the site plan any areas of burning across the site, or in the immediate area.
 - (1) The approximate size of the area.

- (2) Where is the ash from the burning ground being disposed?
- (3) Make a note of any odours.
- (4) Where possible, try and identify the material(s) being burnt.

14. Vehicle maintenance and wash-down areas: description should include, but not be restricted to, the following:

- a. Area(s) where vehicle maintenance/wash down is occurring.
- b. Where vehicles are being parked.
- c. Condition of ground and buildings where these activities are occurring.
- d. Systems and procedures in place.
- e. Drainage from vehicle wash-down area.
- f. Storage and handling of waste oils, coolants, and antifreeze.

15. Details of any workers interviewed to obtain this information should include name, address/home base, and position. If a local person, state how long they have resided in the area and profession.

Section 4: Environmental setting

16. Describe the geology, hydrogeology, hydrology and topographic conditions based on the following:

- a. Soil composition.
- b. Presence of an underlying aquifer (known presence of groundwater beneath the site).

- c. Water supply: list, differentiate and estimate distances to all sources of potable and non-potable water (such as, wells, boreholes, streams, irrigation systems, rivers, ditches and canals).
 - d. Comment on the flood and runoff potential of the site.
 - e. Describe the topography of the site and its surroundings, for example, flat, undulating, sloping and direction.
 - f. Presence of sinkholes.
17. Include a description of the location, distance to, condition, active or redundant of any landfills, mining industries or refineries.
18. Describe any noticeable odours and their source.
19. Make a note of the ambient air quality, including, smog, smoke and odours, and the prevailing wind.
20. Identify any sources of noise and their proximity to the site.

Section 5: Cultural and historical issues

21. Describe the past uses of the site, including past uses of any buildings on the site. Include detailed comment on potential contaminative uses, especially in relation to use, treatment, storage and disposal of hazardous materials.
22. Describe any past uses of the site or buildings which may be of cultural significance.
23. Describe the presence of any monuments or archaeological significant features present on the site or in the immediate surroundings.

Section 6: Ecology

24. Briefly describe the vegetation on the site, are there any signs of stressed vegetation? If so, is there a likely associated cause?

25. Describe any fauna/insects on site (including livestock).
26. Make reference to any known ecological designations/sensitive ecosystems relating to the site or the immediate area.

Section 7: Local community and practices

27. Describe the current uses of the surrounding land and adjoining properties, for example, agricultural, irrigation systems, and residential, commercial/industrial. Limit surroundings to what can be seen, or would clearly affect the area around the site.
28. Where possible, identify and describe historic uses, especially if a past use is likely to have had adverse environmental impact.
29. Where possible, identify any known dependencies on resources or the natural environment.
30. Identify and describe local practises with reference to the sub-headings in Section 3, Land use.

Chapter 3 – Site administration

Section 1 – Lease management

301. **Liabilities of the landlord and tenant.** A lease is a contract which creates an interest in land and which contains a number of covenants (terms) which define the respective rights and obligations of the landlord and tenant. Advice and guidance on the principal terms of a lease are provided at Annex 2B. These include:

- a. Liability for rent.
- b. Liability for repairs and damages.
- c. Tenant's ability to carry out works in default of the landlord.
- d. Tenant's ability to carry out alterations and improvements.
- e. Landlord's rights of entry.
- f. Rights to assign or transfer possession of a site, such as, transfer to another coalition partner.
- g. Rights to sub-let or share occupation.
- h. Options to terminate or renew the lease.

302. **Rent reviews.** Where a lease contains provision for periodic review of rent, the Defence Land Agent (DLA) will enter into appropriate negotiations directly with the landlord. In the absence of the DLA, rent review negotiations may be carried out by the designated Lands Officer in-theatre on advice and authorisation from the DLA.

303. **Lease renewal.** The forms of lease shown in Annexes 2A and 2B confer rights to renew for a period, provided the landlord is given 30 days notice of intent. If the Force needs to retain a site beyond the expiry date of the lease, the DLA must be notified in sufficient time to serve the necessary notice. Thereafter, the DLA will seek to agree an appropriate level of rent

and associated renewal terms with the landlord. However, consideration should also be given to available alternative sites where these could better meet the operational requirement and/or offer better value for money.

In the absence of the DLA, negotiations for lease renewal may be carried out by the designated Lands Officer on advice and authorisation from the DLA.

304. **Alterations and improvements.** The terms of the lease may require the Force to obtain the formal consent of the site owner for any permanent alterations or improvements to the property. Application for such permissions should be accompanied by full specifications, diagrams and plans, and should be made at the earliest opportunity by the DLA, or in his absence by an authorised Lands Officer. In all cases a formal written permission should be obtained, copies of which should be held by both the facilities management and DLA.

305. **Disputes with owners.** Disputes may arise in a number of areas, including liability for repairs or on review of rent. However, by virtue of the international and inter-governmental arrangements which govern their deployment, the Force may not be subject to the jurisdiction of the local courts. Accordingly, landlords may find they have limited opportunities for legal redress in respect of disputes with the Force under lease or contract. This places the Force in a strong negotiating position, although a reasonable and cooperative approach to negotiations must be maintained with landlords at all times. Where dispute resolution cannot be achieved by negotiation, the Force may, by agreement, refer matters for independent arbitration/mediation by suitably qualified and approved individuals and organisations. However, advice and guidance on the matter must first be obtained from the DLA or LEGAD.

Section 2 – Lettings

306. **Commercial lettings.** It may be necessary to sub-let part of a site occupied by the Force for use by third parties such as contractors, commercial service providers or welfare organisations in the employ of the Ministry of Defence. A licence agreement will need to be completed to formalise any such arrangements. Negotiations should be undertaken by the DLA, or in his absence by the designated Lands Officer.

307. **Formalisation of third party occupancy.** The form of agreement to be used depends upon the nature of the arrangement. For example, occupation by local contractors and suppliers could be simply dealt with by the addition of appropriate wording to their main contract. A suggested form of words is attached at Annex 3A. All other third party occupations, for example, for Catering, Retail and Leisure (CRL), should be formalised by way of a stand alone licence agreement, a model for which is provided at Annex 3B. Only the DLA, or authorised Lands Officer, is authorised to sign any sub-let agreements.

308. **The need to control third party occupants.** Such formal arrangements are essential as they define clearly the terms of occupation, and thus provide a formal framework by which third party activities can be effectively controlled and any negative impacts mitigated. For example, the model agreements impose obligations to comply with appropriate health, safety and environmental standards, a requirement to obtain consent for alterations, and obligations regarding reinstatement and remediation. The contractor is also required to indemnify the MOD against any negligent damage or injury caused in exercise of the rights granted.

309. **Charging rent for being on our base.** Commercial third party occupiers not in a direct contractual relationship with the MOD ought also to be charged a market rent in order to cover the Force's costs in providing site infrastructure and security. Advice on appropriate levels of rent should be sought from the DLA.

310. **Lettings to other government departments and coalition force partners.** There may be circumstances where the Force wishes to share part of a site with another UK government department, coalition partner, or multi-national organisation. Occupations of this nature may be governed by intra- or inter-governmental arrangements which may, or may not, require the parties to enter into subsidiary arrangements regarding the occupation of individual sites. Alternatively, rights to occupy may be conferred by way of a stand alone Memorandum of Understanding or similar arrangement, or by a simple licence agreement, as detailed above. Advice on existing arrangements, and the requirement for, and form of subsidiary or stand alone agreements should be obtained from the theatre Civil Secretary, PJHQ or the DLA.

311. **Pre-occupation surveys.** Prior to the grant of a sub-letting, the infrastructure staff should arrange for a pre-occupation survey of the premises. This will form the basis for determining the parties' maintenance and repair obligations during the period of occupation.

312. **Permission to alter.** It is essential that the Force retains control over any permanent alterations or additions to let property. This is to ensure that works are of an acceptable design and standard, that any nuisance or disturbance is minimised, and that the MOD is properly indemnified against any claims or damages arising from the works. The model licence to occupy therefore requires that licensees obtain the formal consent of the Force to any modifications or additions to the property they occupy. Details of intended works, including appropriate construction and elevation drawings and plans should also be provided. On approval of the intended works, the DLA or the authorised Lands Officer should issue a formal licence to alter, a model form of which is attached as Annex 3C.

313. **Landlord's consent.** The terms of the overarching lease may require the Joint Task Force to obtain the formal consent of the site owner to the grant of a sub-letting. Application for such permissions should be made at the earliest opportunity by the DLA or authorised Lands Officer. In all cases, a formal written permission should be obtained, copies of which should be held by the facilities management and DLA.

Section 3 – Estate management issues

314. **Record keeping, alterations and repairs.** It is important to maintain comprehensive records of all alterations and improvements carried out to properties occupied by the Force, as well as details of any repairs undertaken which a lease or occupational arrangement identifies as the landlord's responsibility. Such information will include survey reports, costings, photographs and plans, and will help to limit any property damage claims submitted by the landlord on vacation of the site. The data collected should be recorded on the Facilities Management's Master Index (see Part 2 of JTTP 4-05).

315. **Local planning control systems.** Whilst many aspects of host nation planning-control systems are likely to be suspended during conflict,

there may be some formalised procedures in place, both as regards strategic planning and building control. As normality returns, such systems are likely to be re-introduced or developed. However, the Force may be effectively exempt from the requirements of local planning laws by virtue of the international and inter-governmental arrangements which govern their deployment. Nonetheless, in order to maintain the good will of the local community it is important to cooperate with any planning authorities that do exist; provided this does not obstruct operational efficiency or compromise security. The Force should at least seek to keep planning authorities advised of any major redevelopment, particularly that which may impact upon the local infrastructure.

316. Rights over neighbouring land. Where the Force requires the right to use neighbouring land, for example, to route pipelines through to a borehole or mains water supply, it will normally be necessary to enter into a licence agreement with the landowner (commonly referred to as a *wayleave*). Appropriate negotiations should be undertaken by the DLA or the authorised Lands Officer. Prior to exercising any agreed rights, particularly the laying of pipes or cables, the infrastructure staff should arrange for a simple pre-occupation survey to be undertaken of the routes in question. Where speed is paramount, particularly at the early stages of an operation, a video record or still photographs may suffice; however, the more detailed the record the higher the likelihood of the Force defending any future damage claims.

317. Third party rights over land we occupy. Rights may have been granted prior to the Force's occupation of a site by way of a deed, licence (written or verbal) or through continued and accepted use over a prolonged period (*custom and practice*). Such rights may include permission to enter the site to gain access to neighbouring property, or to lay, maintain and repair electricity cables, sewers or pipelines (such rights exist in the form of easements or wayleaves). Further rights of access may exist in the form of profits, for example, the right to graze sheep on the land, and rights of way for the benefit of the public at large. It is therefore essential that any such rights affecting the Force's sites are identified at the earliest opportunity, and the advice of the DLA should be sought on any rights which are found to exist. In certain circumstances it may be possible to reach an agreement with the persons exercising the right to re-route any pipes or cables, to re-

direct rights of way, or to forgo any profits. Appropriate advice must be sought from the DLA on the formalisation of any such agreements.

318. **Restrictive covenants.** Restrictive covenants are rights created for the benefit of neighbouring land and include, for example, restrictions on development or a limitation on the use of the subject property. It is important that any such covenants affecting the Force's sites are identified at the earliest opportunity and the advice of the DLA should be sought on any rights which are found to exist. Where the benefit of a covenant is no longer appropriate or necessary for the enjoyment of the neighbouring land for which it was created, the right may be modified or discharged on application to the courts. Under certain circumstances, restrictive covenants may also be discharged on agreement between the parties. Advice must be sought from the DLA on the procedures necessary for discharge.

Annex 3A – Formalisation of contractor’s occupancy

(To be inserted into main service contract)

XX. Use of Authorities Premises

The Contractor may use and occupy all that property comprising
[Provide full address and/or description] as shown outlined in red on the plan attached hereto (hereinafter referred to as the “Premises”), under the following terms and conditions:

1. The Premises will be made available free of cost save as otherwise provided under the terms of this Contract.
2. The Premises shall be occupied and used by the Contractor wholly and exclusively for the purposes of as defined within the terms of this contract.
3. The Authority reserves the right of access to the Premises at all reasonable times.
4. The Contractor shall put and keep the whole of the Premises and any buildings, structures or facilities constructed or installed thereon in good repair and condition and free from all pests and vermin.

Alternative clause where it is proposed to accept liability for repairs – The Contractor shall maintain the Premises in a clean and tidy state and free from all pests and vermin. The Contractor will also make good any wilful or negligent damage caused by him, his agents, employees or others occupying the Premises.

5. The Contractor shall pay or reimburse the Authority for all charges in respect of gas, electricity, water, sewerage and telephone lines which shall be consumed or supplied on or to the Premises during the term of this contract. Where required by the Authority, the Contractor shall also pay for the provision and installation of separate utility meters.

6. The Contractor shall not obstruct the free passage of any channels, drains and watercourses, pipes, cables and other services now existing on, in or under the Premises and used for the benefit of any adjoining property of the Authority

7. The Contractor shall not construct any additional building or carry out any alteration and/or modifications to structures or buildings built on the property and the electrical systems therein, without first obtaining the Authority's written consent; which may be granted with or without conditions or refused at the Authority's absolute discretion.

8. If so required by the Authority at termination of this contract, the Contractor shall reinstate the Premises to the state and condition they were in before any permitted alterations or modifications were made.

9. The Contractor shall not obstruct the free passage of any channels, drains and watercourses, pipes, cables and other services now existing on, in or under the Premises and used for the benefit of any adjoining property of the Authority

10. The Premises shall not be used to store any dangerous or combustible or inflammable or explosive material at any time.

11. The Contractor will produce a full Fire Safety Risk Assessment appropriate to the use of the Property to the Authority on demand.

12. The Contractor shall not deposit any waste or refuse nor store any fuels, lubricants, chemicals or other potentially hazardous materials on or within the Property except in a place and manner approved by the Authority and as is in accordance with appropriate UK Environmental and Health and Safety law of which the Authority shall notify the Licensee from time to time.

13. The Contractor shall remediate any environmental contamination for which they are liable as soon as practically possible to a standard acceptable to the Contractor and otherwise in accordance with appropriate UK environmental law as described before.

14. The Contractor shall comply with appropriate UK laws in respect of the use and occupation of the Premises, including such practices and procedures as may be required by UK Health and Safety legislation, of which the Authority shall notify the Contractor from time to time.

15. The Contractor shall comply with all orders, directions, instructions, regulations and procedures made or issued by or on behalf of the Authority, and will not do or permit to be done any act or thing in contravention of any such orders notices directions, instructions, regulations and procedures.

16. If at any time the Contractor fails to comply with his obligations hereunder in respect of repairs, alterations, waste management and the remediation of environmental contamination, the Authority may serve on the Contractor a written notice specifying any works necessary to rectify the default and requiring the Contractor to carry out such works forthwith. If the Contractor fails to carry out the work within 21 days after service of the notice then (but without prejudice to any other right or remedy of the Authority) the Authority may undertake the works and the cost thereof (including but not restricted to all legal costs, surveyors', architects', and other professional fees) shall be paid by the Contractor to the Authority on demand and shall be recoverable as a debt.

17. The Contractor shall not carry out any activities which violate the terms and conditions under which the Authority retains rights to occupy the Premises, of which the Authority may notify the Contractor in writing from time to time.

18. The Contractor shall fully indemnify the Authority against any damage to the Authority's property whether due to the negligence of the Contractor or otherwise and against any claims by and liabilities to any person whether in respect of damage to property or personal injury, disease or death arising out of the Contractor's use of and entry onto the Premises.

19. The Contractor shall maintain third party public liability insurance and property owners' liability insurance in respect of the use of and entry onto the Premises and the Base of which it forms part in the sum of at least five million

British Pounds sterling,¹ or the equivalent in local currency. This will indemnify both the Contractor and the Authority, who must be named on the policy. The policy shall also contain an endorsement that there shall be no right of claim against the Authority, its employees, servants or agents. A copy of the policy must be produced on demand to the Authority.

20. The Contractor shall not assign, transfer, sub-licence or otherwise part with possession of the Premises.

21. It is not the intention of either the Authority or the Contractor to create a landlord and tenant relationship between them in respect of the Premises. Possession and control of the Premises shall at all times remain vested in the Authority and the Contractor shall not have any estate or interest in them or any part of them.

22. On expiry or earlier termination of this Contract, the Contractor's right to use and occupy the Premises will cease and the Contractor will yield up the Premises immediately thereon, in such a state of repair as shall be in accordance with the terms of this contract.

23. Should the Authority require the Contractor to vacate the Premises for any reason whatsoever during the period of the Contract, the Contractor shall do so within fourteen (14) days of receipt of notice from the Authority. In such an event the Authority will provide alternative accommodation of a similar size and type in the vicinity for the remaining period of the contract; such accommodation to be made available on the same terms and conditions as herein provided, including this provision to recover possession. The Contractor shall have no further claim whatsoever against the Authority in respect of the revocation of the rights to occupy the said Premises.

¹ It is MOD policy that a figure of £5 million be used in the UK and for UK-based contractors. However, it is accepted that this is may not be appropriate in areas of conflict. Accordingly, where contractors insist such levels of cover are difficult to obtain, it is recommended that the advice of independent insurance brokers is obtained and their recommended level of cover incorporated into the indemnity the licensee is required to provide. Where insurance is proved to have been impossible to obtain, then this clause may be omitted.

Annex 3B – Model licence to sub-let

(Where there is no main service contract)

LICENCE FOR THE USE AND OCCUPATION OF

..... **[Site Name and Local Address]**.

THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND (hereinafter referred to as the “Licensor”) agrees to grant **[The Name of the Licensee]** (hereafter referred to as the “Licensee”) a Licence for the use and occupation of all that property comprising *[Provide full address and/or description]* as shown outlined in red on the plan attached hereto (hereinafter referred to as the “Premises”), and forming part of *[Provide full address and/or description of the Military Base]* (hereinafter referred to as the “Base”) under the following terms and conditions:

1. The Licensee shall not use or allow the Premises to be used other than for the purposes specified in the First Schedule attached hereto.
2. The Licence to use and occupy the Premises shall be a Licence at Will which may be terminated by either party on 14 days written notice for any reason whatsoever. No reason need be given. At the end of the Notice period this Licence shall end but without prejudice to any rights or remedies which the Licensor or Licensee may have in respect of the terms and conditions contained herein. Any Licence Fees paid for a period after the end of this Licence shall be reimbursed to the Licensee. The Licensee shall have no further claim whatsoever against the Licensor in respect of the revocation of the Licence.
3. The Licensee shall pay to the Licensor a licence fee of per month, payable monthly in advance. The first payment to be made on theday of 20.. and then on theday of each and every calendar month during the period this licence remains in effect.

Alternatively, this section can be replaced with the words, ‘The Premises will be made available free of charge save as otherwise provided below’.

4. The Licensee shall pay or reimburse the Licensor for all charges in respect of gas, electricity, water, sewerage and telephone lines which shall be consumed or supplied on or to the Premises during the period this Licence remains in effect. Where required by the Licensor, the Licensee shall also pay for the provision and installation of separate utility meters.

5. The Licensor reserves the right of access to the Premises at all times.

6. The Licensee shall keep the Premises, and any buildings, structures or facilities thereon, in good repair and condition and free from all pests and vermin.

[Alternative clause where it is proposed that MOD accept liability for repairs – ‘The Licensee shall maintain the Premises in a clean and tidy state and free from all pests and vermin. The Licensee will also make good any wilful or negligent damage caused by him, his agents, employees or others occupying the Premises].

7. The Licensee shall not alter or modify the Premises in any way (including but not limited to the construction or installation of additional buildings, structures or facilities, the alteration or modification of any existing buildings, structures or facilities or the drilling or excavation of any bore holes or wells) without first obtaining the Licensor’s written consent; which may be granted with or without conditions or refused at the Licensor’s absolute discretion. If so required by the Licensor at termination of this Licence, the Licensee shall reinstate the Premises to the state and condition it was in before any such alterations or modifications were made.

8. The Licensor shall comply with appropriate UK laws in respect of the use and occupation of the Premises, including such practices and procedures as may be required by UK Health and Safety legislation, of which the Licensor shall notify the Licensee from time to time.

9. The Licensee shall comply with all orders, directions, instructions, regulations and procedures made or issued by or on behalf of the Licensor and will not do or permit to be done any act or thing in contravention of any such orders, notices, directions, instructions, regulations and procedures.

10. The Licensee shall not carry out any activities which violate the terms and conditions under which the Licensor retains rights to occupy the Premises, of which the Licensor may notify the Licensee in writing from time to time.
11. The Licensee will produce a full Fire Safety Risk Assessment appropriate to the use of the Premises to the Licensor on demand.
12. The Licensee shall not deposit any waste or refuse nor store any fuels, lubricants, chemicals or other potentially hazardous materials on or within the Premises except in a place and manner approved by the Licensor and as is in accordance with appropriate UK Environmental and Health and Safety law of which the Licensor shall notify the Licensee from time to time.
13. The Licensee shall remediate any environmental contamination for which they are liable as soon as practically possible to a standard acceptable to the Licensee and otherwise in accordance with appropriate UK environmental law as aforesaid.
14. If at any time the Licensee fails to comply with his obligations hereunder in respect of repairs, alterations, waste management and the remediation of environmental contamination, the Licensor may serve on the Licensee a written notice specifying any works necessary to rectify the default and requiring the Licensee to carry out such works forthwith. If the Licensee fails to carry out the work within 21 days after service of the notice then (but without prejudice to any other right or remedy of the Licensor) the Licensor may undertake the works and the cost thereof (including but not restricted to all legal costs, surveyors', architects', and other professional fees) shall be paid by the Licensee to the Licensor on demand and shall be recoverable as a debt.
15. The Licensee shall not assign, transfer, sublet, share or otherwise part with possession of the Premises.
16. The Licensee shall fully indemnify the Licensor against any damage to the Licensor's property whether due to the negligence of the Licensor or otherwise and against any claims by and liabilities to any person whether in

respect of damage to property or personal injury, disease or death arising out of the Licensee's use of and entry on the Premises.

17. The Licensee shall maintain third party public liability insurance to cover the use of and entry onto the Premises and the Base of which it forms part in the sum of at least Five Million British Pounds Sterling or the equivalent in local currency¹. This will indemnify both the Licensee and the Licensor, who must be named on the policy. The policy shall also contain an endorsement that there shall be no right of claim against the Licensor, its employees, servants or agents. A copy of the policy must be produced on demand to the Licensor.

18. For the avoidance of doubt, it is not the intention of either the Licensor or the Licensee to create a landlord and tenant relationship between them in respect of the Premises. Possession and control of the Premises shall at all times remain vested in the Licensor and the Licensee shall not have any estate or interest in them or any part of them.

19. On termination of this Licence, the Licensee's right to use and occupy the Premises will cease and the Licensee will yield up the Premises immediately thereon, in such a state of repair and condition as shall be in accordance with the terms of this Licence.

20. It is the intention of the parties that this Licence be subject to English Law.

21. Any Notice required to be given under this Licence shall be in writing and any Notice to the Licensee shall be addressed to and be left at or sent by registered or recorded delivery post to and any Notice to the Licensor shall be addressed to and be left at or sent by registered or recorded delivery post to the **DEFENCE LAND AGENT, HQ**, **BRITISH FORCES POST OFFICE**

A Notice sent by post shall be deemed to be given at the time when it ought in due course of post to be delivered at the address to which it is sent.

¹ It is MOD policy that a figure of £5 million be used in the UK and for UK-based contractors. However, it is accepted that this is may not be appropriate in areas of conflict. Accordingly, where contractors insist such levels of cover are difficult to obtain, it is recommended that the advice of independent insurance brokers is obtained and their recommended level of cover incorporated into the indemnity the licensee is required to provide. Where insurance is proved impossible to obtain, then this clause may be omitted.

The parties record their agreement to this Licence effective theday of 20... by signing below;

SIGNED by [*STATE NAME*]: **THE DEFENCE LAND AGENT**

for and on behalf of the said Licensor **THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND**

in the presence of:

Signature of Witness:

Name:

Address:

SIGNED by[*STATE NAME*]:

for and on behalf of the said Licensee: [*STATE NAME*]:

in the presence of:

Signature of Witness:

Name:

Address:

Annex 3C – Model licence for alterations

Date.....

Dear Sirs,

LICENCE FOR ALTERATIONS

Licence to Occupy dated:

Licensed Property:,

Licensor: The Secretary of State for Defence of the United Kingdom of Great Britain and Northern Ireland

Licensee:

In accordance with clause 7 of the above mentioned licence, the Licensor hereby grants consent to the Licensee to.....*[for example, consent could be granted to ‘drill, construct and maintain a borehole upon the Licensed Property for the extraction of ground water’]* as is in accordance with the attached plans and drawings dated and numbered, (hereinafter called the Works) and subject strictly to the following terms and conditions:

1. That the Works will be carried out in strict accordance with the aforementioned plans and drawings and not otherwise.
2. That the Licensee shall give the Licensor at least 14 working days notice in writing prior to carrying out of the Works.
3. That once commenced, the Works shall be carried out promptly and shall be fully completed in accordance with the aforementioned plans and drawings. Should the Works or any part of them not be fully completed within

a reasonable period of time, to be determined by the Licensor, the Licensee shall reinstate the Licensed Property on demand by and to the reasonable satisfaction of the Licensor.

4. That the Works will be undertaken by an experienced and appropriately qualified specialist contractor as approved by[*The in-theatre Infrastructure Staff*]

5. That during the course of the works the Licensee will ensure compliance with all appropriate UK legislation covering Health and Safety, Fire Prevention, Protection and Escape, and Occupiers Liability.

6. That the Licensee will clear away any building debris and rubbish during the course of and on completion of the Works and reinstate any damage of whatsoever nature and howsoever arising as a result of the Works.

7. That the Licensee will indemnify the Licensor against all actions, claims costs and demands whatsoever and howsoever arising as a result of the Works.

8. That the Licensee shall ensure that the works are carried out in such a manner as shall not cause any obstruction, nuisance or inconvenience to the Licensor, his service personnel or third party occupiers.

9. That the Licensee will not interfere with any plant, equipment, or apparatus in the ownership of the Licensor, or third party occupiers.

10. That on the expiry or earlier termination of the aforementioned licence dated, the Licensee will, at the request of the Licensor, reinstate the Licensed Property to the state and condition it was in prior to the carrying out of the Works to the satisfaction of the Licensor.

11. That if the Licensee fails to comply with his obligations hereunder with regard to the reinstatement of alterations the Licensor may serve on the Licensee a written notice specifying any works necessary to rectify the default and requiring the Licensee to carry out such works forthwith. If the Licensee fails to carry out the work within 21 days after service of the notice

then (but without prejudice to any other right or remedy of the Licensor) the Licensor may undertake the works and the cost thereof (including but not restricted to all legal costs, surveyors', architects', and other professional fees) shall be paid by the Licensee to the Licensor on demand and shall be recoverable as a debt.

Please confirm your acceptance of the above terms and conditions by completing the acknowledgement to this letter and accompanying copy and return the copy letter to the undersigned at the address stated above.

Yours faithfully

SIGNED by *[STATE NAME]*:

for and on behalf of the **THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND**

.....

We acknowledge and accept the terms and conditions set out in this letter of consent dated

SIGNED by *[STATE NAME]*:

For and on behalf of

Dated

Chapter 4 – Site disposal

Section 1 – Preparation

401. **Preparatory planning.** Whether in response to campaign requirements or simply to renationalise the estate, some sites will no longer be required by the Force. Part 4 of JTTP 4-05 describes the overall planning and preparation for the withdrawal from a site. As part of that planning process, lands and environmental issues must be considered:

- a. **Timing.** What is the timetable for vacating the site, undertaking repair, remediation and reinstatement works and, where appropriate, terminating the lease?
- b. **Site condition.** What is the general condition of the site in relation to its initial takeover (as evidenced by the pre-occupation survey and Environmental Baseline Survey (EBS) reports)? What damage or contamination is attributable to the Force? This will require a preliminary site survey.
- c. **Scale of remediation and repairs.** What is the likely cost of any repairs, remediation and reinstatement works necessary to comply with the terms of any occupational arrangements, applicable international and local law, and MOD policy requirements?

402. **Lease termination.** Where a site is held under lease, the Defence Land Agent (DLA) should be requested to start negotiations for an early termination of the lease or, where provided for in the lease, arrange for a notice of termination to be served on the landlord at the earliest opportunity. Leases will generally contain a clause providing for between 30 days and three months notice of termination. In the absence of the DLA, negotiations for surrender of a lease or service of a notice to terminate may be undertaken by the authorised Lands Officer acting in consultation with the DLA.

403. **Land Quality Assessment.** A Land Quality Assessment (LQA) provides an assessment of environmental liability and is based on the information from the EBS. The Environmental Liability Management Group (ELMG) should be asked to provide guidance on the production of a LQA.

404. **Repair, remediation and reinstatement liabilities.** Land, buildings and facilities should be repaired, remediated and reinstated in accordance with host nation arrangements and lease agreements. This should take into account any applicable international or local laws and MOD policy requirements. Any repair and remediation plan must also reflect the condition of the site on initial occupation. Where there are no records of a site's initial condition, a professional and practical judgement should be made as to what damage, if any, has been caused by the Force. Liability will therefore vary on a case-by-case basis, and accordingly the advice of the DLA and the Defence Infrastructure Organisation (DIO) ELMG should be obtained as early as possible in the hand-back process.

Section 2 – Hand-back

405. **Post-occupation survey report.** A Post-occupation Survey (POS) should be carried out after any remediation work and prior to the hand-back. The survey and report will provide an essential record of the condition of the property on the date of hand-back. Together with the pre-occupation survey report, it will form the basis for determining the MOD's liability for any outstanding damages. A copy of the report should be retained by the facilities management in theatre and the original forwarded to the DLA for safe keeping together with all associated photographs. Guidance on the format and content of the report is provided at Annex 4A.

406. **Hand-back certificate.** On completion of the POS, the site is to be formally handed back to the owner by the DLA or the designated Lands Officer in theatre. Representatives of the landlord and tenant should sign a certificate detailing their agreement, or otherwise, on liability for any outstanding repairs, remediation and reinstatement works and/or the payment of appropriate compensation. A model hand-back certificate is provided at Annex 4A. The model certificate provides optional wording to suit various circumstances, including those where the landlord is content that the property has been delivered up in good and tenantable repair and will make no claim for compensation. Wording is also provided for where compensation for dilapidations has been agreed on the date of hand-back, and where dilapidations and any compensation remains to be agreed.

407. **No owner identified.** Where no owner has been identified, 'handing back' will simply involve vacating the site. In such circumstances, reasonable effort should be made to secure the site and any buildings and structures. Buildings and structures should be made wind- and water-tight, and services drained down and disconnected.

408. **Damage claims.** There may be damage impractical or uneconomic to repair, caused by the Force during its occupancy of a site. It is therefore inevitable that, on occasions, legitimate claims will be made against the MOD for damage compensation. All such claims must be dealt with by the DLA. However, authority may be granted to the authorised Lands Officer to deal with low value or non-complex claims in liaison with, and subject to, the advice of the DLA. On no account should anyone else discuss liability with the site owner, nor should claims be invited.

409. **No agreement.** It is not necessary to have reached a settlement on a claim at the time a site is vacated.

Annex 4A – Post-occupation survey report

Report reference N ^o :			
Video reference N ^o :			
Photograph reference N ^o :			
Site location/address:			
Map sheet title:	Sheet N ^o :	Map series:	Site grid reference:
Occupying unit:			
Date of occupation:			
Date of survey:			
Name and unit of surveyor:			

Owners identity:			
Owner's address, and telephone N ^o :			
Lease reference N ^o :			
Lease commencement date:			

General description of the site and facilities, including buildings, structures and service utilities.
--

Historical information concerning the site.

Detailed description of all damage found to have been caused during period of tenure by the deployed Force.

Element	Description (from pre-occupation survey)	Damage caused during occupation
<i>External</i>		
Structure		
Roof		
Roof drainage		
Decoration		
Doors		
Windows		
Ancillary buildings and structures		
Site works and landscaping		
Lighting		
<i>Internal</i>		
Floors		
Walls		
Ceilings		
Doors		
Lighting		
Decoration		
Electrical installations		
<i>Room number</i>		
1		

Post-occupation LQA report reference N° and date:

Other post-occupation reports reference N° and dates *(if applicable)* – State type of report, for example, structural survey.

Detailed description of any repairs carried out by the deployed Force in default of the landlord. (Include reference to appropriate reports and records where applicable.)

Detailed description of alterations and improvements carried out and assets gifted by the deployed Force (include reference to appropriate reports and records where applicable).

Description of required remediation and reinstatement works with cost estimates (if applicable).

Meter readings

Electricity:

Water:

Gas:

Pre-occupation survey report Reference N° and date:
Environmental baseline survey report reference N° and date:
Post-occupation LQA report reference N° and date (<i>if applicable</i>):
Other pre-occupation reports reference N° and dates (<i>if applicable</i>) – <i>State type of report, for example, structural survey.</i>

Post-occupation survey report guidance notes

Site location

1. Grid coordinates should be provided together with a postal address where available. A location plan should also be provided.

General description of the site

2. Reference should be made to the pre-occupation survey report. If this report is unavailable, provide a brief written summary of all buildings, structures and facilities, together with site and building plans.

Historical information concerning the site

3. Reference should be made to the pre-occupation survey report. If this report is unavailable, any known history prior to occupation should be provided, including any previous uses of the site, duration of use and identity of the occupier.

Details of damage attributed to the Joint Task Force during occupancy

4. Comparison should be made with the pre-occupation survey report to identify any damage that has occurred during the deployed Force's occupation of the site. A detailed written record of all such damage should be produced on a structure-by-structure, room-by-room basis. If a pre-occupation survey report is unavailable, a record of all damage should be made with an indication/judgement as to what damage is attributable to the deployed Force and what was likely to have been pre-existing.

5. A photographic record should also be taken of the entire site, including all structures, facilities, buildings (external and internal, room-by-room) and fixtures and fittings. Photographs should match those taken on the pre-occupation inspection to permit direct comparison. Any damage attributable to the deployed Force should be clearly identifiable and referenced to available plans and drawings, upon which the location of any damage should be recorded.

6. Where appropriate, an inventory of contents should be taken (including items such as, carpets, curtains, and furniture) and the condition of such contents noted.
7. Meters for utilities for which a bill may be raised should be read and the reading recorded.
8. Any environmental damage should be recorded on the Land Quality Assessment report.
9. For a checklist of the facilities to be taken into account on inspection, see the guidance notes on pre-occupation surveys provided at Annex 2C to this JTTP.

Repairs carried out in default of the landlord

10. There may be occasions where the landlord fails to comply with the lease obligations in terms of repair, and the deployed Force may have been forced to carry out essential works at MOD cost in order to ensure that structures remain adequately safe and secure. Where the cost of such repairs have not previously been recovered from the landlord, they may be used to offset damage claims submitted on vacation of the site.
11. Details of all such repairs should be recorded, including the date of completion and associated costs, together with any consequential damage found to have occurred, for example, failure to repair the roof resulting in damage to internal plasterwork and wall coverings.

Improvements and alterations

12. Improvements of a permanent nature, carried out by the deployed Force, may have increased the value of the owner's interest and could be used to offset damage claims submitted on vacation of the site.
13. Details of any such improvements¹ should be recorded together with the date of completion and associated costs. Such works could include

¹ Other than those agreed as a condition of occupation.

improvements to roads and boundary fences, utilities, buildings and to the environmental condition of the site.

14. Any assets (such as ISO containers or air conditioning units) which have been gifted or handed over to the site owner should be noted with an estimate of value.

Details of works required to restore the site for hand-back

15. Whilst every effort should be made to make good any damage attributable to the deployed Force, prior to hand-back, there may be occasions where it is impossible, impractical or not cost effective to undertake remedial works. In such circumstances, a rough estimate of the costs of remediation should be prepared for assistance in the negotiation of any subsequent claim.

Signatories and acknowledgements

16. The survey report should be signed by a designated representative of the deployed Force as representing a true and faithful record of the condition of the premises as at the date of survey. The survey will thus form a basis for determining the deployed Force's final liability in terms of repair.

Annex 4B – Property hand-back certificate

THIS AGREEMENT is made between **THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND** (hereinafter referred to as the “Transferor”) and *[insert Owner’s/Landlord’s name]* (hereinafter referred to as the “Transferee”) in respect of all that property known as and more particularly identified on the plan attached hereto (hereinafter referred to as the “Property”).

Whereas: *(select one option and edit as necessary to fit the circumstances)*

Option 1 –

The Property was held under the terms of a lease dated and made between the Transferee and the Transferor for a term of....years effective from.....

The said lease was terminated by the Transferor with effect from
[Alternative wording ‘The said lease expired on’]

The Transferor intends to vacate the Property and hand it back to the Transferee.

Option 2 –

The Property has been occupied by the Transferor since

The Transferor intends to vacate the Property and hand it back to the Transferee.

Whereby:

It is hereby acknowledged and agreed by the parties to this agreement that the Property was handed back to the Transferee on *[insert date of handback]*. With effect from that date the Transferee will assume responsibility for all liabilities and obligations in respect of the Property. The Transferor’s liabilities in respect of the property will cease absolutely.

It is further acknowledged by both parties that: *(select one option)*

Option 1 –

The Property was handed back in a clean and tidy state, free of defects and that no works of repair, remediation or reinstatement are required for which the Transferor is responsible. It is further agreed that the Transferee will make no claim in respect of dilapidations nor demand the payment of compensation from the Transferee.

Option 2 –

The Property was not handed back in good and tenable repair and condition but that the Transferee will make no claim in respect of dilapidations nor demand the payment of compensation from the Transferee.

Option 3 –

The Property was not handed back in good and tenable repair and condition but that payment of compensation in the sum of [specify in words (specify in figures)] has been/is to be made by **THE SECRETARY OF STATE FOR DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND** to[*name of Owner/Landlord*] in full and final settlement of any and all claims for damages injuries expenses or loss arising from outstanding works of repair, remediation or reinstatement for which the Transferor is responsible and the Transferee will make no further claims in respect of such dilapidations nor demand the payment of additional compensation from the Transferee.

Option 4 –

The state of repair of the Property as at the on the date of hand-back and liability for compensation in respect of dilapidations (if any) remains to be agreed upon.

Date of agreement:

SIGNED by the said Transferee [*State name*]:

in the presence of:

Signature of Witness:

Name:

Address:

SIGNED by [*State name*]:

for and on behalf of the said Transferor: **THE SECRETARY OF STATE FOR
DEFENCE OF THE UNITED KINGDOM OF GREAT BRITAIN AND
NORTHERN IRELAND**

in the presence of:

Signature of Witness:

Name:

Address:

Lexicon

Glossary of terms

abstract of title

A summary listing of the documents which demonstrate title (ownership) of a particular property. Such documents are generally registered in the local land registry office.

addendum

An addition to a document that forms part of it.

adverse possession

A method of acquiring or claiming title (ownership) to a piece of land owned by another by occupying it in defiance of the other's title. Most jurisdictions have statutes that set out a certain period of time throughout which the person claiming adverse possession must occupy the land before title passes to that person by operation of law.

alienation clause

A term of a lease which allows the tenant to assign his interest (see assignment), sub-let or part with possession of the whole or part of the demised premises (see demised premises).

arbitration

A means of resolving disputes using an independent arbitrator as opposed to a court of law. Often used for lease contract disputes, rent reviews, and so forth. Binding arbitration involves the parties agreeing to be bound by the decision of the arbitrator.

assignment

Transfer of an interest in property. Usually when a tenant (assignor) transfers a lease, with the landlord's consent, to another tenant (assignee) before the original term expires. An assignee of a lease will be bound by the terms and conditions of the lease as the original party.

breach (of lease or contract)

A failure to meet one's obligations, whether under a lease, contract or otherwise. A breach of a lease term allows the innocent party to enforce the term, forfeit the lease or sue for damages.

break clause

A clause in a lease agreement giving the landlord, or tenant, or both, the right, under specified circumstances, to terminate the agreement, before its normal end date.

cadastre

A form of land registry introduced in various countries as a means of raising tax revenue on property transactions, for example, in France and the Former Republic of Yugoslavia.

charge

An encumbrance to which a property is subject, such as a right of access or a financial lien, such as, those taken by lenders to secure the repayment of a loan or mortgage.

chattel

An item of personal property which is not affixed to the land or building (as opposed to a fixture: an item which is a part of the land or building). Tenant's chattels can be removed by the tenant at the end of a lease.

consideration

The value, asset, service, information, and so on, which is offered to another party in a contract in exchange for that party agreeing to enter the contract.

counterpart

A duplicate copy of a legal document: the landlord's copy of a lease; the tenant's copy being the lease itself.

covenant

A promise contained in a lease or agreement.

damages

The estimated monetary value of the injury a person suffers as a result of an unlawful act or negligent act of another person. Once a case is proven, a court may award damages.

deed

The legal instrument by which title to property is conveyed from one person to another.

deed of surrender

A legal instrument in which a tenant gives up his leasehold interest to the landlord.

default

Failure under the terms of a lease to make payments in full, on time, or at all, or to comply with any other obligations contained within the agreement.

defective title

Ownership of property which is subject to some competing claim.

demise

In a strict legal sense this means the same as 'lease', or the right to exclusive possession for a specific term. In practice, often used to simply identify the demised premises, which is the property leased to a particular tenant.

dilapidations

Items of disrepair of a leased property arising out of a tenant's failure to comply with the lease terms, giving rise to a landlord's right to damages.

discharge

To meet one's obligations.

easement

The right of the owner of one parcel of land to use all, or part, of the land of another for a specific purpose. It runs with the land and requires one property to be in dominant position (enjoys the benefit of the easement) and one property to be in servient position (is subject to the right).

encroachment

The intrusion into one property for the improvement of a neighbouring property. It may result in a claim for adverse possession if the encroachment is unchallenged for a long period of time.

encumbrance

Any right, interest or other claim against land that is registered on title and affects the owner's ability to sell the property.

evidence of title

Instruments or documents that provide any proof or information regarding ownership of land.

fee simple

The best title to property available, representing the absolute ownership of a parcel of land.

fixture

An item which is attached to, and forms part of, the buildings or land itself, and is therefore included in a lease, unless specifically excluded in writing.

forfeiture

The loss of a right, claim, interest or item of property as a result of one's failure to meet one's legal obligations.

grant

The act of giving title to another. It may also be used as a noun, meaning the instrument that transfers title.

hold harmless clause

Also known as 'save harmless clause'. A clause in a contract under which one party releases another party from legal liability for a stated risk.

holding over

The term used to describe the action of a tenant who retains possession of a premises after the lease has expired.

implied contract

An agreement which is not reduced to writing but is created, under the common law, on the basis of the behaviour of the parties, which suggests that they are acting under an agreement.

indemnity

A document in which one party agrees to take responsibility for the losses and damages suffered by another party or parties.

indexed rent

A rent where the amount paid changes in accordance with changes in a specified index (i.e. the cost of living index).

inherent defects

Problems with a property or building which are not visible to the casual observer but which may surface later.

joint and several liability

When two or more people agree to take on the same obligation (such as joint tenants under a lease) they may each be responsible for a certain portion of the obligation, or they may each be responsible for the entire obligation.

When the lease or contract states that liability is 'joint and several' it means that all parties together are responsible for the obligation ('joint') but also that each party individually is responsible for the entire obligation on their own ('several'). The landlord or creditor may bring an action against all of them or just one for a breach of such an obligation.

jurisdiction

The extent of authority:

- 1) of a court over a certain matter or person;
- 2) of a government organisation over a territory.

lessee

A tenant under a lease.

lessor

A landlord under a lease (the owner of the property being rented).

notary public

A designation authorised by law, and administered by the government, allowing a designated person to verify (or notarise) signatures and copies of documents.

notice to quit

A notice from a landlord to a tenant ordering the tenant to leave the property.

power of attorney

A document, signed by the donor in front of witnesses, authorising another person to act on the donor's behalf and to bind the donor to those actions.

quarter days

The traditional rent collection days – Lady Day – March 25, midsummer – June 24, Michaelmas – September 25 and Christmas day – December 25. These represent the quarters of the year, or 91 days.

quiet enjoyment

A term of a lease which requires the landlord to allow the tenant to use the demised premises exclusively and without interruption, under the terms of the lease.

restrictive covenant

Any limit or control on the owner's ability to use a property. It may be contained in a deed and be binding on the land and future owners of it.

reversionary interest

The remnant of an estate that the landlord holds after granting a lease to a tenant.

run with the land

A legal term which suggests that a rule, restriction, right or obligation forms part of the land itself, and is transferred to each new owner along with the land.

surrender

To give up, to turn over something to a person claiming interest in it.

tenancy

The right to use and occupy all or part of a property under a rental agreement.

tenancy at will

Form of tenancy created by written agreement in which the landlord may evict the tenant at any time.

tenancy from year-to-year (month-to-month)

A form of tenancy in which the tenant's right to occupy the premises lasts for a stated period of time, but may be extended by mutual consent for another period.

tenants improvements

Additions to a leased premises made by the tenant that might normally be considered fixtures (and, therefore, part of the premises) but that, under contract or law, the tenant is entitled to remove at the end of the lease period.

tenure in land

The fashion in which an owner holds title to land.

time is of the essence

A standard statement in a lease or contract which ensures that all dates and times of day noted in the lease/contract are important and cannot be ignored by any of the parties without the consent of the others, except in breach of the lease/contract.

title

The legal term for one's ownership of an interest in land.

unencumbered property

Land that has no claims, liens or mortgages registered against it.

user

Term of a lease which defines the purpose for which a property is occupied. Unless specifically stated, the tenant will not be able to use the property for any other purpose without the landlord's formal consent.

wear and tear

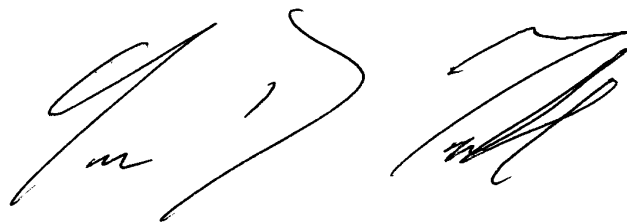
The term for the reduction in value of an asset resulting from normal use.

JOINT TACTICS, TECHNIQUES AND PROCEDURES 4-05.3

(2nd Edition)

INFRASTRUCTURE PROJECT MANAGEMENT

Joint Tactics, Techniques and Procedures 4-05.3 (JTTP 4-05.3) (2nd Edition),
dated November 2012,
is promulgated
as directed by the Chiefs of Staff



Head of Doctrine, Air and Space (Developments, Concepts and Doctrine)

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Amendment no.	Date of amendment	Initials

Preface

1. **Background.** Joint Tactics, Techniques and Procedures (JTTP) 4-05 *Operational Infrastructure*, was first published in 2001. Unfortunately, none of the planned supporting sub-documents were subsequently published.
2. **Purpose.** This sub-document to JTTP 4-05 is a detailed guide to the management of infrastructure projects particularly on the operational estate. JTTP 4-05.3 *Infrastructure Project Management* is one of several sub-documents that deal with specialist topics in the planning and delivery of infrastructure support on operations. As an intelligent customer, it is the responsibility of the Project Sponsor (typically the Infrastructure Staff) to ensure that the project is competently managed. Management, in accordance with this document, can be used as a good benchmark against which to make an assessment. Extensive reference is made to the main document, JTTP 4-05, and it should be read alongside this sub-document.
3. **Scope.** Project management, as practised on the operational estate, is based on industry best practice as promoted by the Association of Project Management (APM) and as described in BS 6079 *Project Management*. JTTP 4-05.3 covers infrastructure projects delivered by a military and/or contracted means. This document is applicable to *all* infrastructure projects on the operational estate. However, for simpler, military, equipment-only tasks, Military Engineering Volume I, Part 3 *Planning and Control of Engineer Tasks* should be consulted.
4. **Target audience.** This publication is aimed at providing the guidance required by personnel responsible for:
 - a. The planning of infrastructure support to operations.
 - b. The delivery of infrastructure support in theatre.
5. **Application outside the operational estate.** Whilst it is focused primarily on infrastructure projects within the operational estate, the general principles it provides are applicable to projects elsewhere, such as:
 - a. Indigenous infrastructure projects in support of stabilisation.
 - b. Training projects; however, roles, responsibilities and funding criteria are likely to be different.

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Chapter 1 – Project management basics

Section 1 – Project management in context

101. **Project management.** Chapter 4 of Joint Tactics, Techniques and Procedures (JTTP) 4-05 *Operational Infrastructure* explains what infrastructure project management is, in the context of the operational estate.

‘Project management is the process of planning, organising, securing and managing resources to bring about the successful completion of specific project goals and objectives. A project is a unique, temporary endeavour, having a defined beginning and end. In the context of the operational estate it is therefore about delivering either a new item of infrastructure or support for it’

102. **What project management entails.** Project management is about:

a. **Planning.** Planning a project involves collating information, identifying the activities that need to be completed, sequencing these activities as efficiently as possible, and then allocating resources (manpower, equipment, materials, money) to the activities so that they can be executed. Inevitably, resources are constrained and the sequence has to be adjusted to balance resource availability. Consideration must be given to risks and other factors that may disrupt the successful flow of the project, particularly those activities that are on the critical path; contingency plans and control measures should be identified. A number of tools and techniques exist to support project-planning, including: Work Breakdown Structures and scheduling,¹ as well as several proprietary software packages such as *Microsoft Project*.

b. **Communicating.** Regular and effective communication between stakeholders is key to a successful project. It is explained further in Chapter 2.

c. **Monitoring performance.** Progress is the principal element of ‘performance’ that is monitored. There are several methods of

¹ For example, a works programme, synch-matrix, or Gantt chart.

measuring progress: estimated time of completion, percentage completion, weighted percentage completion, and a number of methods based on expenditure (cost).

d. **Reporting performance.** The prompt and effective reporting of assessed performance is essential. It can be done in a number of ways, and can vary depending on the size and complexity of the project. Report formats include: written prose, progress bars on a works schedule, symbols (traffic lights/arrows in a tabular format), or a weighted scorecard. The project report should attempt to cover all of the monitored performance issues in some manner.

e. **Controlling the project.** Monitoring and reporting project performance enables the Project Manager to identify potentially damaging trends before they become a serious issue. Early identification of trends is therefore key to effective project control. Appropriate contingency plans developed during the planning stage will also ease project control. Methods of controlling a project include:

(1) **Time.** Time is often the most important element in operational infrastructure projects. Work can sometimes be accelerated by providing incentives or by accepting reduced standards. Low priority elements of the requirement can be sacrificed to save time. Time delays can be corrected by applying additional resources, or rescheduling the work to focus existing resources on critical activities.

(2) **Cost.** Allowing more time for delivery can sometimes reduce cost. Again, low priority elements of the requirement can be sacrificed to save costs. Cost-growth can be stopped by controlling variations to the original requirement, finding cheaper suppliers and accepting a quality penalty, and identifying potential savings. For example, through value engineering.

(3) **Quality.** In order to enhance the quality or improve upon the original requirement, it is often necessary to accept increases in cost and/or time. A reduction in quality during construction often increases the future costs of maintenance. Clear

articulation of the required standards can often prevent quality issues arising. This must be backed-up by insisting on the reworking or replacement of poor quality elements of the work. A rigorous inspection and testing programme will also improve quality.

(4) **Rebalancing time, cost and quality.** Figure 1.1 shows how boosting performance in one area comes usually at the expense of another. The longer-term consequences of any rebalancing of Time, Cost and Quality (TCQ) must therefore be assessed carefully.

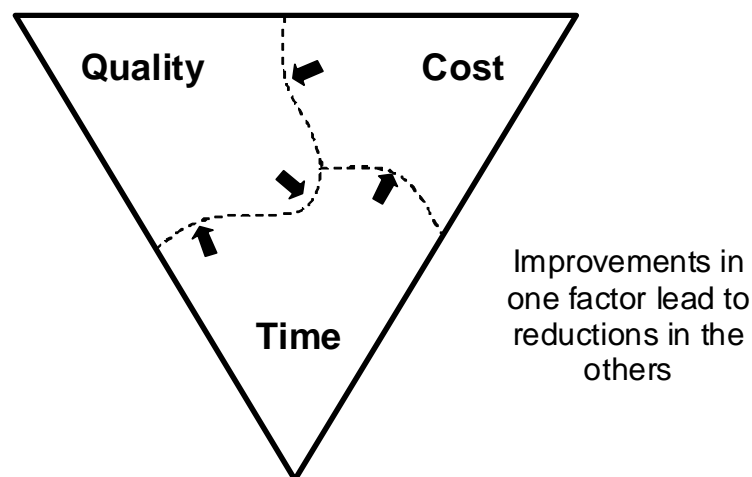


Figure 1.1 – Balancing time, cost and quality

(5) **Relationships.** Conflict between stakeholders can be extremely detrimental to a project. Early intervention may be required to deal with potential disagreements.

Insight 1-1: Project management is simply about the efficient execution of a discrete package of work in order to ensure it is delivered as agreed.

103. **Programme management.** Infrastructure projects are required as part of an overall programme of work to develop the operational estate. Each location has an Infrastructure Development Programme (IDP), which is

delivered through the completion of individual, discrete projects. JTTP 4-05 describes programme management as:

'Programme management is the coordination, direction and oversight of the implementation of a set of related projects and activities in order to deliver outcomes and benefits related to an organisation's strategic objectives. In the context of the deployed Force it is therefore about ensuring that infrastructure and other projects and activities deliver the changes in military capability that are required within the overall operational strategy and plans. Programme management therefore aligns three critical elements:

- *The operational strategy and plans.*
- *Delivery mechanisms for change.*
- *Normal, business-as-usual activities.'*

104. **Projects and tasks.** A task is a relatively simple, short duration activity best understood and performed by a specific person or organisation; a project usually consists of many tasks. Whilst the guidance in this document is applicable to all infrastructure projects on the operational estate, its processes and terminology may be overly complex for simple, standalone military construction tasks. For such tasks it may be more appropriate to follow the provisions of Military Engineering Volume I, Part 3 *Planning and Control of Engineer Tasks* (ME Vol I, Pt 3). The professional judgement of the Joint Force Engineer should be sought if there is any uncertainty. Figure 1.2 should be used as a guide to determine how best to approach this:

- Finance.** If the work requires finance (specifically that obtained through a formal business case) then JTTP 4-05.3 should be followed.
- Contracted support.** If the work requires contracted delivery at any stage then JTTP 4-05.3 should be followed. If, however, only a Military Construction Force is needed then ME Vol I, Pt 3 should be used.
- Battlefield versus campaign infrastructure.** Chapter 1 of JTTP 4-05 describes the difference between battlefield and campaign

infrastructure. Battlefield infrastructure is required for the direct support of combat; it is usually delivered with greater urgency and to timescales often measured in hours. Campaign infrastructure is generally anticipated to have a longer design life and the threat to life from an adversary is lower. Therefore the balance between general safety issues and operational risk is much less one-sided. JTTP 4-05.3 is more appropriate for items of campaign infrastructure.

Insight 1-2: Do not over-complicate the project management process. Laconic effectiveness negates volume of paperwork.

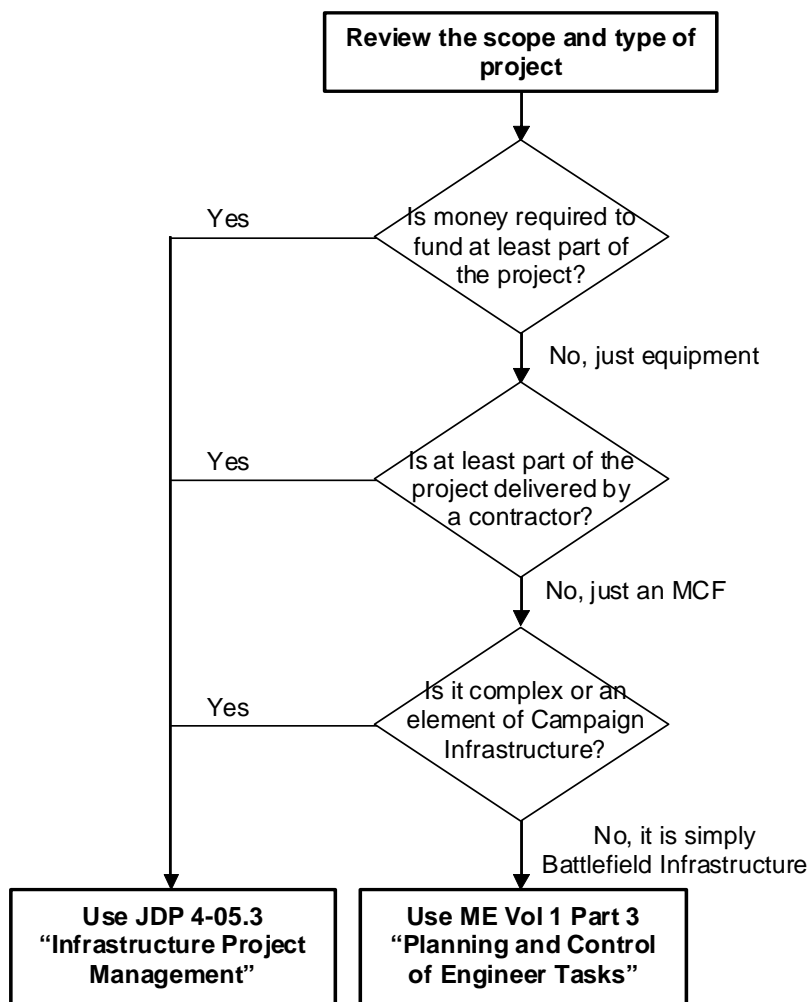


Figure 1.2 – Determining the most appropriate project/task management guide

105. **Project-managed approach to procuring contracted support.** As explained in Chapter 6 of JTTP 4-05, contracted infrastructure support is best procured using a project management approach. The management of a contract is run as a project. This can lead to confusion between what is meant by 'project management'; is it of the contract or of the work itself? There must be clear articulation of who is responsible to whom, and for what. This should be laid out in the Procurement and Contracting Strategy. Figure 1.3 shows a number of management models that explain this relationship.

- a. **Project management.** This is the *through life cycle management* of the activities required to complete the work.
- b. **Contract (project) management.** This is the through life cycle control of the contract by which the work is completed. Figure 1.3 shows the central role the Works Contract Officer (WCO) plays in contract management. The contractor should employ a competent Project Manager to deliver the project in accordance with the contract. Contract management is explained in detail in Chapter 6 of JTTP 4-05.

Insight 1-3: When drawing up a project management structure make sure that it is clear who is responsible to whom and for what; and that a Project Manager is responsible for the handover of the project.

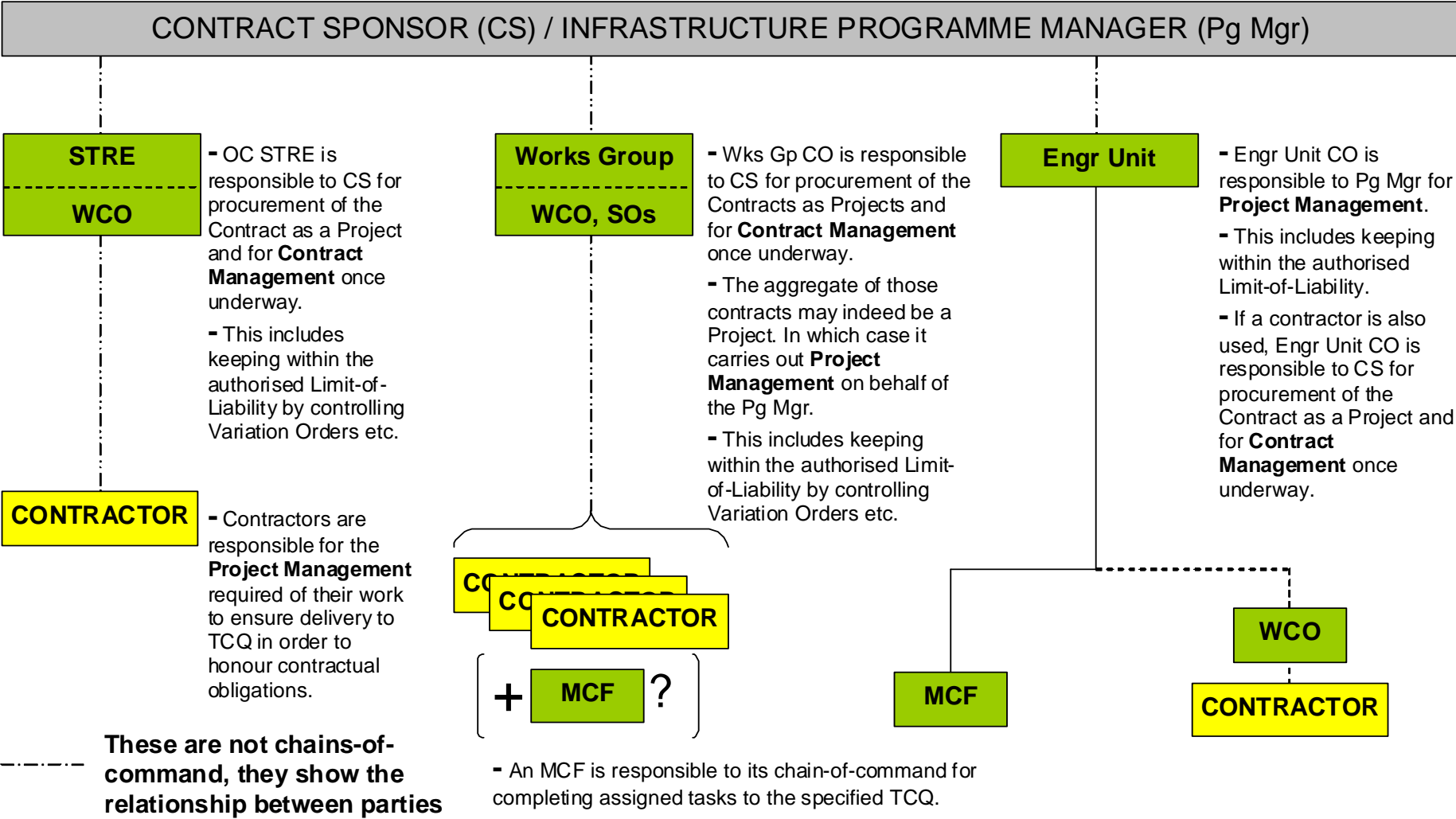


Figure 1.3 – Example contract and project management models

Section 2 – Sponsorship and control

106. **Project sponsorship.** The person who commissions a project is known as the Project Sponsor. The Project Sponsor may also be a Contract Sponsor (CS) if there is a contract, and may also be the Infrastructure Programme Manager (Pg Mgr). These latter roles are explained in Chapters 6 and 4 of JTTP 4-05 respectively. Acting on behalf of their headquarters, the Infrastructure Staff *usually* carry out the role of Project Sponsor for *most* infrastructure projects on the operational estate. The responsibilities of the Project Sponsor include:

- a. Ensuring that a competent Project Manager is appointed. The advice of the Joint Force Engineer should be sought in selecting a Project Manager.
- b. Obtaining funds for the project and ensuring military units are tasked as appropriate.
- c. Reviewing progress of the project, particularly at formal gateway reviews.
- d. Signing-off key project deliverables, particularly the handover at the completion of work.

Insight 1-4: There must be a Project Sponsor who is empowered to make decisions.

107. **Project Manager.** The Project Manager is responsible to the Project Sponsor for the delivery of the project to time, cost and quality. This does not constitute responsibility in the sense of a chain-of-command.

108. **Continuity of Project Manager.** The Project Manager plays the central role in a project. Ensuring his continuity in post considerably reduces confusion and maximises the chance of successful completion. Nevertheless, on most basic projects delivered using a Military Construction Force (MCF), the role of Project Manager *usually* transfers from the Military Design Authority (MDA) to the head of the Military Construction Force between the preparation and implementation stages.

109. **Meetings, reviews and steering groups.** The Project Manager monitors and controls the day-to-day progress of the project. The Project Sponsor should also periodically monitor the progress of the project, particularly in relation to other projects and activities. This could be a weekly or fortnightly planning group. If it is a particularly large or complex project, the Project Sponsor may decide to set up and lead a steering group comprised of stakeholders and Subject Matter Experts (SMEs). Even if applying the lightest of control measures, the Project Sponsor must ensure that Gateway Reviews are conducted and that decisions are taken at the appropriate decision points in the project's life cycle.

110. **Stakeholders.** Stakeholders are the organisations and people who have an interest or role in the project, or who are impacted by it. For the largest or most complex projects, stakeholder analysis and management may be necessary. Key stakeholders are listed below. Their responsibilities during an infrastructure project are provided in Annex 1B.

a. **User.** The project process is started when a possible need for infrastructure arises. The person or organisation that is expected to operate from, or with, this infrastructure is called the 'user'. Sometimes it can be difficult to identify a user: the unit may not yet have deployed, or it may be an item that benefits many users. Nevertheless, a user must be appointed and made responsible for articulating the Statement of Requirement (SOR)/Statement of Need (SON).¹ It is from analysis of the user's requirement that the critical success criteria are drawn.

b. **Infrastructure Staff.** The Infrastructure Staff in theatre and at Permanent Joint Headquarters (PJHQ) usually act as Project or Contract Sponsor. Their overall responsibilities are detailed in Chapter 2 of JTTP 4-05.

c. **Facilities Manager.** Once something is built, responsibility for arranging its maintenance will *usually* fall to the Facilities Manager (FM). The FM's responsibilities are detailed in Chapter 8 of JTTP 4-05.

¹ The terms Statement of Requirement and Statement of Need are, in effect, interchangeable. It is generally more appropriate to use Statement of Need when managing the project. This is explained in Chapter 2 of JTTP 4-05.

- d. **Approval Authorities.** The specific design and occupation approval of a number of organisations is often required, such as: Theatre Fire Officer (TFO), Environmental Health Officer (EHO), Mobile Air Operations Team (MAOT) and Senior Ammunition Technical Officer (SATO). Approval may also be needed by a coalition or host nation coordinating Authority if the work is to take place within a base or other area under their control. If the location is rented then the terms of the lease should describe what approvals, if any, are required.²
- e. **Military Design Authority.** As explained earlier, the Project (or Contract) Manager is drawn from the Military Design Authority (MDA).
- f. **Military Construction Force.** If a Military Construction Force (MCF) is used, it is very much considered to be a stakeholder.
- g. **CDM Coordinator.** The CDM³ Regulations have a significant impact on infrastructure projects. The CDM Coordinator plays an important role.

Section 3 – Strategy and planning

111. **Delivery strategy.** Chapter 5 of JTTP 4-05 explains the broad infrastructure delivery strategies available to a deployed Force.⁴ A project may be delivered through one, or any combination, of these means. The requirement for project management varies considerably depending on the selected strategy. Chapter 5 of JTTP 4-05 also shows the pivotal role the MDA plays in project managing, or otherwise coordinating the delivery of infrastructure support. Particular attention should be paid to the project management and coordination of a Contractor Logistics (CONLOG)-delivered project if it is not being undertaken by the in-theatre MDA or MCF.

112. **Design, resource, construct and maintain.** Chapter 5 of JTTP 4-05 also explains how infrastructure support is delivered through four overlapping

² See JTTP 4-05.2 *Lands and Environmental Procedures*.

³ Construction (Design and Management) Regulations 2007.

⁴ Military Construction Force, in-theatre engaged Contractor, Infrastructure Support Provider, Contractor Logistics (CONLOG), allies engaged through a Memorandum of Understanding, and service provision.

activities: design, resource, construct⁵ and maintain. This is not a linear process; it is iterative and involves feedback between each of the activities.

Insight 1-5: Design is an iterative progression. As a rule-of-thumb:

5–15%	Design concept (for stakeholder approval).
20–40%	Indicative design (for Invitation to tender (ITT) as design and build).
60–90%	Detailed design (to start construction or ITT).

a. **Design to available resources.** Given the often parlous state of the supply chain on operations, it is particularly important to ensure that designs are readily resourced with materiel. If items are not easily obtained, the design should be changed to make use of those that are. This requires close, daily, coordination between the designers and those who obtain resources. This will probably involved an iterative design process; as design progresses, checking that materiel can be readily obtained with undue delay. Resourcing strategy is covered in Chapter 5.

b. **Design to construction capability.** The design must take account of the capabilities of those who, it is intended, will construct the facility or structure. Local contractors have different skills, equipment and preferred methods of working to an MCF. The designers must have a good working knowledge of the capabilities of those who will construct. The design must be *buildable*.

c. **Design and construct for maintenance.** The design and construction must also take account of the capabilities of those who, it is intended, will maintain the facility or structure. An indigenous occupant may not have the same skills or access to spares as an MCF.

113. **Master Data Assumptions List.** During the course of a project, information may not be available in sufficient detail to make a fully informed

⁵ This includes procure/install/assemble.

decision at the point in time when it is needed. Assumptions will have to be made in order to allow the project to progress, but a lack of detailed information will increase the risk of errors in the project. Due to the length of infrastructure projects and the rotation of personnel, it is often difficult to understand the basis of earlier decisions in a project and, critically, to understand the significance of changes. For long duration, high profile or expensive projects, it is good practice to record these assumptions on a Master Data and Assumptions List (MDAL). This is simply a table that lists the assumption, the originator, any reference material used to form the assumption, and what the residual impact may be in terms of a constraint, risk or a concern.

114. **Project Management Plan.** A project will have a large number of plans covering all aspects of the project describing how it will be conducted, the resources needed, its organisation and any procedures to be followed. The purpose of a Project Management Plan (PMP) is to pull these plans together (physically or virtually) so that there is one Reference. The Project Management Plan is not a static document; it changes with the project. The Project Manager is responsible for drafting the Project Management Plan and determining the appropriate size and format.⁶ The Project Management Plan should describe:

- *Why?* The purpose of the project.
- *What?* The objectives, scope, deliverables and their acceptance criteria.
- *When?* Timescales, phasing and milestones.
- *Where?* The location.
- *Who?* Project roles and responsibilities.
- *How?* Management tools, techniques, monitoring and reporting.
- *How much?* The project Limit-of-Liability and cost management.
- *How well?* The agreed quality standards.
- *What if?* The project risks and the actions needed to control them.

⁶ BS 6079 gives a useful check list.

Annex 1A – Stakeholder responsibilities

1A1. **Responsibilities by project stage.** This Annex gives broad guidance on the responsibilities of some key stakeholders stage-by-stage through a project. Although details vary from project-to-project, this Annex is intended as a useful checklist for key activities. Whereas Chapter 2 gives a stage-by-stage perspective on project flow, this Annex gives the stakeholder perspective.

Project Sponsor/Infrastructure Staff

Definition stage

1A2. **Statement of requirement.** Assist the User in preparing the Statement of Requirement by providing guidance on content and format, and prioritising the requirement within the theatre Infrastructure Development Plan (IDP). Some expectation management may be required at this early stage.

1A3. **Option Study.** If necessary, direct the preparation of a detailed Option Study to clarify the way ahead for the project.

1A4. **User Requirement Document.** Develop the User's Statement of Requirement into a User Requirement Document (URD) in readiness for the assessment stage. The Staff should ensure that the URD is reasonable and appropriately prioritised. The MDA may assist with the development of the URD.

1A5. **Decision Point 1.** At the end of the definition stage, the Infrastructure Staff must decide whether or not to take the project forward to a detailed design.

Assessment stage

1A6. **Appointments.** Ensure that a Project Manager and CDM Coordinator are clearly appointed. For large/complex projects, the Infrastructure Staff should consider arranging for an independent party to conduct a project evaluation.

1A7. **User Requirement Document.** Finalise the URD and pass it to the design team to develop the detailed design.

1A8. **Siting Board.** Convene and lead a Siting Board to agree the location (and possibly the layout) of the proposed facility.

1A9. **Design Review.** Encourage, and if necessary direct, attendance of key stakeholders at the Design Review. Ensure that the User confirms that the proposed solution will meet the original requirement.

1A10. **Delivery strategy.** After receiving advice from the Joint Force Engineer, determine the delivery strategy for the project. This decision will guide the design team in developing the most appropriate design product.

1A11. **Ownership of risk.** Obtain agreement from all stakeholders on who will own and control key risks. The chain of command should be informed of the most significant risks.

1A12. **Obtain funding approval through an Investment Appraisal and Business Case.** Prepare an Investment Appraisal (IA) and Business Case (BC). There will be pressure to produce one as early as possible in a project; it may be started during the definition stage. It must be completed by the end of the assessment stage to support Decision Point (DP) 2.

1A13. **Decision Point 2.** Confirm Financial Approval.

Preparation stage

1A14. **Authority Approvals.** Ensure that all appropriate Authority Approvals have been obtained.

1A15. **Decision Point 3.** Confirm that the requirement is extant, the CDM Coordinator has no objection to proceeding and, if appropriate, that the contract may be awarded before giving authorisation to start construction.

Implementation stage

1A16. **Monitor progress.** Regularly monitor progress, ensuring that there is adequate project management control.

1A17. **Handover Board.** Convene and lead a Handover Board to accept the facility as meeting the requirement set out in the URD. Ensure its transfer to the Theatre Asset Register, and acceptance by the FM along with all requisite information (usually in the form of a Health and Safety File).

Closure stage

1A18. **Snagging.** Ensure that all defects and deficiencies identified at the Handover Board are addressed (i.e. *snagging* is complete).

1A19. **Close accounts.** Ensure that action is taken by the MCF to close the material accounts.

1A20. **Decision point 5.** Once satisfied that snagging has been complete and that the maintenance organisation is in place, close the project.

Military Design Authority

Definition stage

1A21. **Statement of Requirement.** Assist the User and Infrastructure Staff in producing the Statement of Requirement (SOR) and URD.

1A22. **Operational Infrastructure Reconnaissance.** Conduct an Operational Infrastructure Reconnaissance (OIR).

1A23. **Option Study.** Undertake an Option Study if required.

1A24. **Initial estimates.** At the end of the definition stage, advise the Infrastructure Staff on outline costs, resource requirements and potential risks; and make recommendations on the broad way ahead. This advice will inform DP1.

Assessment stage

1A25. **CDM Coordinator.** The MDA (normally Works Group HQ) is tasked to act as CDM Coordinator.

1A26. **User Requirement Document.** The URD must be completed early in the assessment stage in order to feed the development of the detailed design. The MDA can assist the Infrastructure Staff and User in preparing the URD, developed from the SOR. The MDA also advises on feasibility and Value for Money.

1A27. **Project Manager during design.** The OC of a Specialist Team Royal Engineers (STRE) is normally tasked to act as Project Manager. His team will take the project forward through to detailed design and contract management if delivery is by contractor.

1A28. **Investment Appraisal and Business Case.** The MDA may be asked to assist the Infrastructure Staff in developing cost estimates to support the Investment Appraisal and Business Case.

1A29. **Project assurance.** The MDA is normally responsible for providing project assurance.

1A30. **Desktop study.** Gather all available information and carry out a study into what the project will involve. The Operational Infrastructure Recce Report (OIRR) (if one has been completed) and the URD are key sources of information.

1A31. **Tactical Infrastructure Reconnaissance.** A Tactical Infrastructure Reconnaissance (TIR) should be carried out.

1A32. **Concept design.** A concept design should be drawn up based on the URD, and information derived from the desktop study and TIR.

1A33. **Design review.** An independent, peer review of the design is good practice. The design review should seek to obtain common stakeholder agreement on a concept design, together with statutory approvals agreed in principle.

1A34. **Design development.** The concept design should now be taken forward based on the decisions made at the design review.

1A35. **Detailed design.** The detailed design will provide the refined time and cost estimates that will inform DP 2.

1A36. **Authority Approvals.** Authority Approvals are obtained during design development. Ideally, all the requisite approvals should be obtained before DP 2. However, it is still possible to progress work without them, albeit at risk. Good collaborative working between the design team and the relevant Approving Authorities during design development should minimise any changes to the design, and reduce the risk to the project.

Preparation stage

1A37. **Design control.** The MDA will continue to be responsible for the design. This will include:

- Provision of an MDA Site Representative.
- Approval of variations and changes.
- Approval of construction materials (particularly, proposed use of alternative materials other than to those specified in the design).

1A38. **Military delivery.** Project Manager responsibilities are normally handed over to the head of the MCF at this point. A formal and detailed handover should take place.

1A39. **Contractor delivery.** The Project/Contract Manager will oversee:

- a. **Expressions of Interest (EOI).** Potential contractors should be canvassed.
- b. **Invitation to Tender (ITT).** An ITT Package should be issued to potential contractors, providing all supporting information and instructions on tender submission.

c. **Tender evaluation and contract award.** Tenders should be evaluated for technical and commercial merit and, once Financial Approval has been given, the contract awarded.

1A40. **SHEF approval.** The MDA, if acting as CDM Coordinator, is responsible for approving the Construction SHEF Plan required for DP 3.

1A41. **Lessons identified.** The end of the preparation stage is a good point to capture interim lessons learned.

Implementation stage

1A42. **Design control.** Responsibility for design control continues from the preparation stage.

1A43. **Witness tests, inspections and commissioning.** The MDA Site Representative should witness any tests, inspections and commissioning results. If he is not familiar with the technical aspects of a particular element of the work, he should call in someone else who is.

1A44. **Contractor delivery.**

a. **Approvals.** The MDA should arrange approvals of the contractor's designs and plan for delivery, including his arrangements for SHEF.

b. **Government Furnished Equipment.** If Government Furnished Equipment (GFE) is to be provided, it should be procured by the MDA.

c. **Contractor supervision.** The MDA is likely to provide a Supervising Officer to assist the Works Contract Officer (WCO) in his role as Contract Manager.

1A45. **Handover Board.** The MDA should be represented at the Handover Board.

Closure stage

1A46. **Liaison with Facilities Manager.** The MDA should liaise with the Facilities Manager (FM) to ensure a smoother transfer of the project.

1A47. **Closure of accounts.** Any financial or materiel accounts should now be closed.

1A48. **Post project report.** The MDA provides significant input to this report.

1A49. **Archiving.** All paperwork and relevant information should be gathered together, after any audit, and archived.

Military Construction Force

1A50. **Main focus.** The MCF's main focus is to plan for, and execute, the implementation of the project, and then to ensure a smooth transition to long-term maintenance arrangements.

Definition stage

1A51. **Operational Infrastructure Reconnaissance.** Ideally, the MCF should send a representative on the Operational Infrastructure Reconnaissance (OIR), which will enable an Outline Engineer Plan to be written at the assessment stage.

Assessment stage

1A52. **Outline Engineer Plan.** The MCF should complete an Outline Engineer Plan (OEP) as soon as possible after the OIR to act as a warning order for the work, and initiate concurrent planning and preparation.

1A53. **Tactical Infrastructure Reconnaissance.** Ideally, the MCF should send representatives on the Tactical Infrastructure Reconnaissance (TIR) which will enable the Detailed Engineer Plan to be written at the preparation stage.

1A54. **Design review.** The MCF should be represented at the design review, where its view can be very useful in selecting the preferred construction method and delivery strategy, and in ensuring that the proposed design is buildable within the MCFs capabilities.

Preparation stage

1A55. **Assumption of Project Manager role.** The head of the MCF will usually take over responsibility as Project Manager at the start of the Implementation Stage. In taking on this responsibility, he should be clear that he is required to:

- a. Ensure good communication with all stakeholders. In particular, he should ensure that those responsible for risks actively manage them.
- b. Run the project beyond the end of construction, through handover, into maintenance, and to formal project closure once all appropriate documentation is in place.

1A56. **Detailed Engineer Plan.** After receiving the Tactical Infrastructure Reconnaissance Report (TIRR), the MCF should produce a Detailed Engineer Plan (DEP) to set out in detail its plan for delivery. The DEP should:

- Produce a detailed schedule, materials list and cost estimates.
- Refine the Risk Register.
- Contain a Detailed SHEF Plan including method statements, which must be approved by the CDM Coordinator before work starts on site.

1A57. **Financial and contractual military.** Before deployment, the head of the MCF should ensure that appropriate approvals are in place to commit finance and enter into contracts.

1A58. **Pre-project training.** Pre-project training should be arranged for difficult or risky elements of the work.

1A59. **Design detailing.** The detailed design will not be 100% complete. The MCF must be prepared to complete an element of design detailing during the preparation and implementation stages. The main reasons for this are insufficient time allocated to the assessment stage, and the MCF using different construction methods and/or materials to those envisaged by the design team.

1A60. **Resourcing materiel.** The MCF should engage with the supply chain and consider the supply of long-lead items. The hiring of local labourers or sub-contractors should be considered.

1A61. **Deployment.** Deployment should be authorised by DP 3. Deployment will typically take place in phases and be led by an advance party. Key early tasks will be to establish the site facilities, set out the site and in-load sufficient stores and materials to begin construction.

Implementation stage

1A62. **Procurement and accounting.** The MCF should aim to procure necessary construction materiel early, and establish an accurate accounting system from the outset.

1A63. **Construction.**

- Quality should be controlled through the use of an Inspection and Test Plan.
- Design detailing will continue.
- As-built drawings should be updated as the work progresses.
- Change control should be exercised through the MDA's Design Control Officer.
- Project risk should be monitored as the work progresses.
- Progress and performance must be reported regularly to the Infrastructure Staff.

1A64. **Commissioning.** Commissioning should be addressed in phases as elements of the work are completed.

1A65. **Maintenance training.** Training of maintenance personnel should take place before the Handover Board.

1A66. **Pre-handover site tour.** The MCF should arrange a tour of the site in advance of the formal Handover Board to address as many issues as possible.

1A67. **Handover Board.** The MCF must be present at the Handover Board, at which a snagging list should be agreed.

Closure stage

1A68. **Defects Liability (Maintenance) Period.** During the defects liability period, the MCF:

- Is responsible for maintenance until this is formally taken on by others.
- Must rectify the snagging list.

1A68. **Health and Safety File.** The MCF should complete the Health and Safety (H&S) File as soon possible after handover and pass it to the CDM Coordinator for approval and then to the Infrastructure Staff for retention.

1A69. **Maintenance data pack.** The MCF should complete a maintenance data pack as soon possible after handover and pass it to the Facilities Manager for approval.

1A70. **Closure of accounts.** The MCF is responsible for closing the project construction materiel accounts.

1A71. **Recovery.** Recovery should be planned well in advance.

1A72. **Post project report.** The MCF provides significant input to this report

1A73. **Archiving.** All paperwork and relevant information should be gathered together, after any audit, and archived.

CDM Coordinator

1A74. **Main focus.** The CDM Coordinator acts as the focal point for the application of CDM Regulations within the project. His main task is to coordinate the passage and sharing of information between all project stakeholders. This ensures that the project health and safety risks relating to construction methods, materials, user maintenance, and normal operation will have been designed out, or minimised as far as reasonably practicable.

Definition stage

1A75. **Appointment.** The Project Sponsor confirms the appointment of the CDM Coordinator. This is explained in Chapter 12 of JTTP 4-05.

Assessment stage

1A76. **Advise the staff.** The CDM Coordinator should ensure that the Staff are aware of their responsibilities, particularly in respect of:

- The duties of the client (normally PJHQ or the in-Theatre HQ commissioning the work, represented by the Infrastructure Staff).
- Ensuring that the lead (or principal) contractor on site is clearly identified.
- Retaining the H&S File after project closure.

1A77. **Stakeholder communication.** Ensure that the key stakeholders communicate fully at this early stage of the project. Encouraging all parties to attend the design review is a useful way of assisting coordination.

1A78. **SHEF risk.** Ensure that responsibility for significant SHEF risks is agreed at the design review.

1A79. **Notification.** If the project fits the parameters set out by the CDM Regulations for notifying the Competent Army Authority and Inspectorate

(CAA&I) (or HSE as appropriate) then the CDM Coordinator is required to inform the appropriate body.

1A80. **Host nation regulations.** Advise relevant stakeholders of host nation Health and Safety regulations when they are stricter than those of the UK.

1A81. **Initial SHEF Plan.** Ensure that the Initial SHEF Plan is appropriate.

Preparation stage

1A82. **Detailed Engineer Plan.** For military delivery, the CDM Coordinator should check that the MCF's plan is adequate to perform the task safely. Once he has satisfied himself of the plan's suitability, he should inform the Infrastructure Staff so that they may authorise the start of work.

Implementation stage

1A83. **Tender evaluation.** Ensure that SHEF issues are considered as part of the technical evaluation of tenders.

1A84. **Contractor's SHEF Plan.** For contracted delivery, the CDM Coordinator should check that the contractor's SHEF Plan is adequate. Once he has satisfied himself of the plan's suitability, he should inform the Infrastructure Staff so that they may authorise the start of work.

1A85. **Site arrangements.** Ensure that adequate regard is paid to Health and Safety on site and that the welfare facilities are up to standard. Site orders/rules should be prepared and clearly communicated to all before entering the site. Arrangements should also be in place for appropriately reporting injuries/dangerous occurrences.

1A86. **Design changes.** Ensure that the SHEF implications of proposed design changes are being considered.

1A87. **Handover Board.** The CDM Coordinator may advise the Board on any snags that would prevent, or render unsafe, occupation or use of the completed facility.

Closure Stage

1A88. **Health and Safety File.** The CDM Coordinator must check that the H&S File prepared by the contractor/MCF is suitable. At the end of a project, the CDM Coordinator should ensure that the completed file is passed to the Infrastructure Staff for safekeeping (normally handed over to the maintenance provider or facilities management).

Chapter 2 – Infrastructure project management

Section 1 – Infrastructure project flow

201. **Infrastructure projects on the operational estate.** From the manufacture of a car to the provision of a hospital, whatever the purpose of a project, the generic management processes are the same. This Chapter describes how those generic processes are adapted to deliver infrastructure projects on the operational estate.

202. **Project stages.** A project is divided into a series of stages in order to assist in its control and management. These stages run from the inception of a project to its handover to those that will run it. Chapter 4 of JTTP 4-05 places these stages into the wider context of through-life management. The project stages are:

- Definition.
- Assessment.
- Preparation.
- Implementation.
- Closure.

203. **Project activities.** Figure 2.1 is a guide to the sequence of activities that take place during each stage of a project. The circumstances of every project are different and so in practice these activities are not as sequentially linear as the diagram might infer. Also, some activities may overlap across the boundary between stages. The diagram in Figure 2.1 assumes that the Infrastructure Staff act as Project/Contract Sponsor and that the Project/Contract Manager is from the MDA. Military, or contracted support may undertake the work. This is the most common arrangement for the delivery of infrastructure projects on the operational estate.

204. **Decision Points.** Figure 2.1 also shows how Decision Points (DPs) mark the boundaries between project stages. Each project stage must end with a clear decision point. They are points in the life cycle of a project where major decisions must be made, either to advance to the next stage or to

adjust/cancel the project. It is worth noting that operational experience has shown that fewer than half of all proposed projects proceed beyond DP 2 – Funding approval.

Insight 2-1: The flow of the project should be managed through its stages rather than the activities they contain. Enforce the discipline of timely and unambiguous decision-making at the decision points.

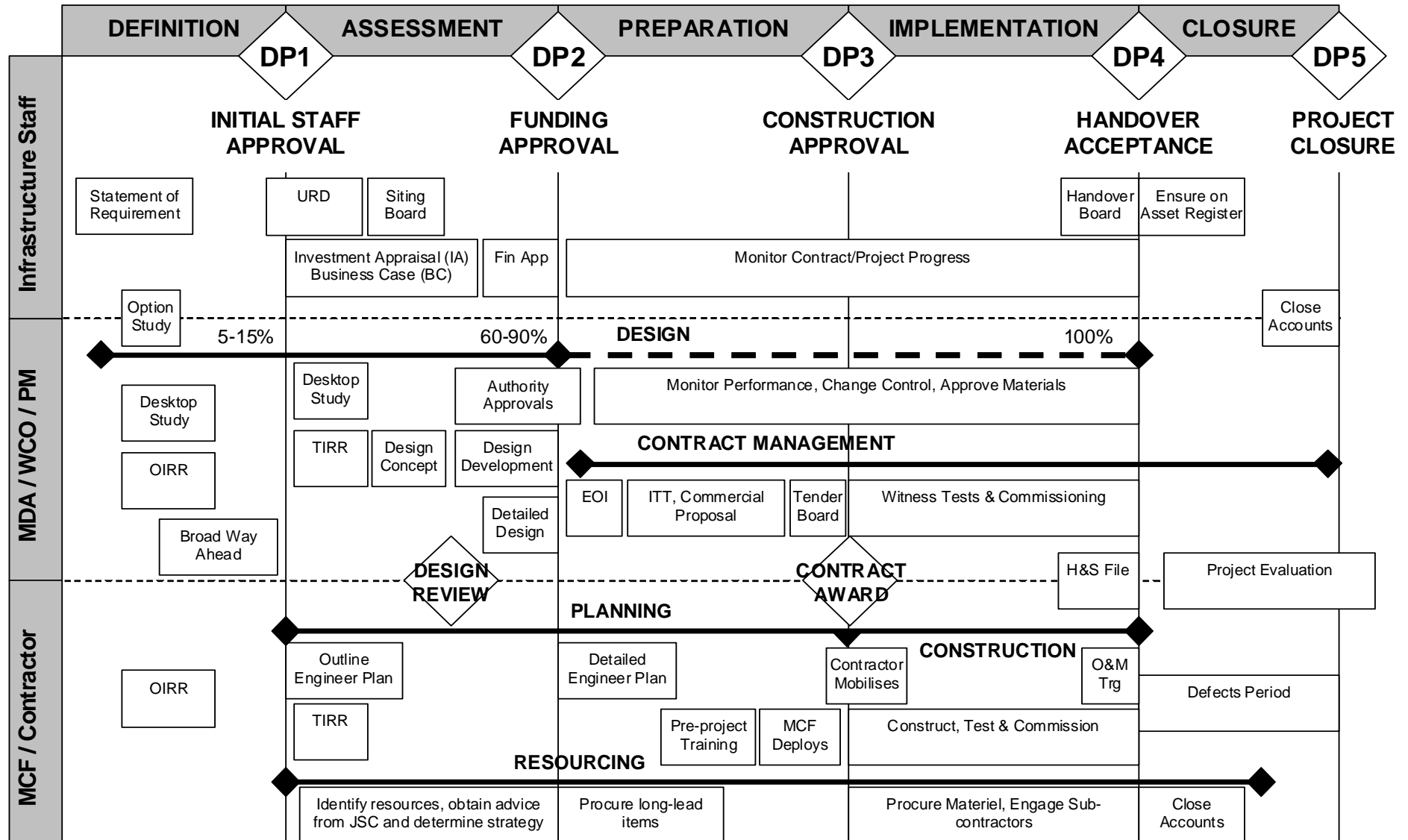


Figure 2.1 – Infrastructure project flow diagram.

205. **Definition stage.** The project process is started by a User articulating their requirement in the form of an SOR.¹ The purpose of the definition stage is to clarify and refine the proposed requirement sufficiently for the Infrastructure Staff to decide whether to proceed with the project. The SOR is checked against the relevant Infrastructure Development Plan (IDP). If the requirement is supported, the Infrastructure Staff prepare an Investment Appraisal (IA) and Business Case (BC). The Military Design Authority (MDA) may be asked to assist the Infrastructure Staff in developing the requirement if it is technically complex. The MDA will almost certainly be asked to assist in estimating the cost. An Operational Infrastructure Recce (OIR) may be needed to determine the technical options for delivery and provide initial cost and time estimates. Early involvement of the construction force (particularly MCF) encourages concurrent preparation and can influence the design options. The definition stage culminates with Decision Point (DP) 1, the Initial Staff Approval.

206. **Assessment stage.** The assessment stage is used to develop the requirement and determine key project information, such as time and cost estimates. The Infrastructure Staff develop the User Requirement Document (URD) in conjunction with the user and the MDA, convene a Siting Board to agree proposed locations for the project, and, in consultation with the Joint Force Engineer, determine the best delivery strategy. The MDA will continue the design process and produce a design concept after a detailed Tactical Infrastructure Recce Report (TIRR) that refines the Operational Infrastructure Recce's time and cost estimates. A key activity in this stage is the design review. The design review presents design options to the stakeholders to seek all-party agreement on an optimal solution. The design review effectively defines and fixes the requirement; later changes to the requirement will incur time, cost and quality penalties. Again, construction force involvement at this stage encourages concurrent activity. The assessment phase concludes with DP 2 – Funding approval.

207. **Preparation stage.** The approval of funding at DP 2 enables the contract tendering process, and the procurement of construction materials and resources, to begin. The MDA retains the designer's responsibilities for providing additional design details, approving requests for changes, and approving materials. These responsibilities continue into the implementation

¹ Annex 2A of JTTP 4-05 gives a template infrastructure request form.

stage. The MDA will also manage any contract tendering process. The construction force now mobilises for the task, procuring construction materials through the Engineer Logistic chain, and conducting pre-project training. The preparation stage culminates with DP 3, construction approval, which allows a final opportunity to terminate the project before construction activity commences and significant resources are committed.

208. Implementation stage. The principal activity during the Implementation Stage is the construction of the facility or structure. Site inspection and testing is a continuous process throughout this stage and can extend into the *defects liability*² period. Operation and Maintenance (O&M) training should also be completed during this stage but the blurred delineation of practical completion and *beneficial occupancy*³ can cause an overlap into the next stage. The Implementation Stage culminates in DP 4, Handover acceptance, which is achieved through a Handover Board convened by the Infrastructure Staff.

209. Closure stage. The Handover Board is likely to identify a number of defects and deficiencies commonly known as ‘snags’ that are rectified during a maintenance period. Responsibility shifts from the constructor to the maintainer. The construction force will finalise the project accounts and submit the account to the Infrastructure Staff for closure. Project evaluation is good practice. DP 5 marks the formal closure of the project.

Section 2 – Definition stage

210. Overview. During the definition stage, an initial study is conducted and the following questions are answered in sufficient detail to allow a decision to be made on whether to proceed with the project:

- What is required?
- Is it possible to meet the requirement?
- What is likely to be the best way to deliver the project?
- What are the potential problems and what further work is required?

² See Chapter 6 of JTTP 4-05 *Operational Infrastructure*.

³ *Ibid.*

- What is the estimated cost?

211. **Stakeholders.** The key stakeholders during the definition stage are the User, the Infrastructure Staff and the MDA. The requirement is likely to be identified by the User, but it must be supported and integrated within the appropriate IDP. In order to reduce the likelihood of subsequent difficulties, it is important that the experienced engineers within the MDA undertake the assessment of project viability, delivery options and potential problems.

212. **Requirement.** The requirement must be captured, analysed and tested; this is explained in detail in Chapter 2 of JTTP 4-05. The responsibility for clarifying the requirement rests with the Infrastructure Staff. The requirement should be set out in terms of the use to which the proposed facility will be put, and the benefit that will be gained from it. At this early stage, the requirement should not be written so as to constrain the possible physical solutions. It is important to determine what is *needed*, not what is *wanted*.⁴ The requirement should make clear:

- The output required from the project.
- A justification for the work and a statement of the impact if the requirement is not met.
- Where appropriate, how the proposed facility fits in with other works on-going or planned for the theatre.

213. **Project success criteria.** Ideally, the project output should be clarified in terms of the time and funds available for the work, and the standards to be achieved: Time, Cost, and Quality (TCQ). Defining the output in this way is useful in avoiding any misunderstanding of the User's needs, and also provides a set of clear objectives against which the success of the project can be subsequently evaluated.

- Time.** The time by which the project must be completed is usually the most important factor on operations. Often, time targets for project delivery are defined in two phases, Initial Operating Capability (IOC) and Full Operation Capability (FOC). In this case, it is vital to be clear which elements of the project are required to meet IOC and those

⁴ This is why the term Statement of Need (SON) is often favoured.

that can be left to FOC. Early use of a facility can sometimes be achieved through *beneficial occupancy* but there are increased project risks and penalties to this course of action.

b. **Cost.** Affordability based on the funds available.

c. **Quality.** The quality standard is often determined by the period for which the completed facility is expected to be in use. An understanding of the anticipated design life is key. However, specific quality requirements may be important to the User; where there are critical issues over which the User can broker no compromise, they should be identified early.

214. **Project viability.** The initial study should consider whether an infrastructure project is the best way of meeting the requirement and the key constraints that may prevent its successful completion.

a. **Non-project solutions.** Ways of meeting the requirement other than through a construction project should be considered. Alternative solutions may include meeting the requirement using existing facilities or the hire of temporary facilities.

b. **Constraints.** Constraints, such as the need for planning consents, Force Protection, access and the availability of local contractors/materials, should be considered at this early stage. Significant constraints may prevent the project from being deliverable. Lesser constraints may limit the possible options for a construction method or delivery strategy, or they may be treated as project risks that require close monitoring.

215. **Operational Infrastructure Reconnaissance.** In many cases, it will be possible for the initial examination into the potential project to be carried out largely as a desktop study. However, for large, complex, or remote projects, it will usually be necessary to conduct a reconnaissance specifically to carry out the project definition work. Such a reconnaissance is termed an Operational Infrastructure Reconnaissance (OIR) and is normally led by the

CO of a Works Group.⁵ Annex 2A gives more gives a framework for the OIR. When an OIR is carried out, a report should be produced to provide:

- a. The Infrastructure Staff with the information necessary to decide whether to proceed with the project.
- b. A recommended broad way ahead for the subsequent conduct of the project.

216. **Broad way ahead.** The project options identified during the definition stage (either from an OIR or a desktop study) should be presented to the key stakeholders in order to obtain broad agreement on the way ahead. The recommendations given will inform DP 1, the Initial Staff Approval. The information presented effectively forms a 5–15% design solution, and should include:

- a. **Option study.** The initial assessment of project options (in terms of construction methods and delivery strategy) can usually be done in a relatively straight-forward manner through the assessment of advantages and disadvantages. For large and complex projects, however, a separate Option Study supported by an Investment Appraisal should be prepared. Annex 2B gives a framework for an Option Study.
- b. **Estimates.** These early estimates are particularly important and their use is explained in Chapter 2 of JTTP 4-05. Based on the proposed way ahead, estimates for each option considered should be made of the rough order of:
 - (1) Cost (typically +/- 40 %, but this is entirely dependent on the quality of information available).
 - (2) Time (typically +/- 20%).
 - (3) Manpower and equipment.

⁵ Where one is present.

c. **Potential project problems.** The major problems that could occur during the project, up to and including its final closure, should always be considered in the definition stage:

(1) **Project risk.** Key project risks that could seriously impact on the project should be identified and recorded in an initial project Risk Register. In some cases, the scale of these risks may lead to a decision not to proceed with the project.

(2) **Safety, Health, Environmental and Fire hazards.** Major Safety Health Environmental and Fire (SHEF) hazards should also be identified at this early stage. Some of these may occasionally result in significant project risks; more often, identified hazards can influence the potential construction method. The need for additional medical cover for the project should also be considered.

(3) **Project continuity.** The loss of continuity within the project as it passes from stage to stage is often a problem. Ways in which project continuity can be best achieved should be considered during the definition stage.

(4) **Design continuity.** If possible, an individual should be identified who can play a role in design during the assessment and preparation stages, and then continue on to act as the MDA Site Representative in the Implementation Stage.

(5) **Safety, Health, Environment and Fire continuity.** Chapter 10 of JTTP 4-05 gives guidance on the application of safety rules to the operational estate. A member of the MDA⁶ should maintain an overview of SHEF issues throughout the project, from the identification of key hazards in the definition stage, to the compilation of the Health and Safety File in the preparation stage and the start of operation and maintenance in the closure stage.

⁶ Probably as CDM Coordinator.

217. **Project Management Plan.** For very large or unusual projects, a formal Project Management Plan (PMP) should be developed to describe how the project is to be carried forward. It should clarify project scope, objectives, governance, responsibilities, management resources and control mechanisms. This is explained in Chapter 1.

218. **DP 1 – Infrastructure Staff approval.** At the end of the definition stage, the findings of the initial study into the potential project should be presented to the key stakeholders. DP 1 will determine how the project will proceed:

- a. Approve the recommended way ahead; authorise the assessment stage to begin.
- b. Stop work on the project.
- c. Direct further study.

Section 3 – Assessment stage

219. **Overview.** The assessment stage takes the initial work completed in the definition stage and develops it in more detail. A concept design is produced and the optimal construction method and preferred delivery strategy are determined. Project risks, SHEF hazards and initial estimates are developed and refined.

220. **Stakeholders.** The assessment stage work is normally led by a Specialist Team Royal Engineers (STRE). The User confirms the acceptability of the proposed solution. Where possible the STRE should also liaise with the potential Military Construction Force (MCF), the logistics node (for resources) and the Approving Authorities.

221. **Appointment of Key Roles.** As soon as possible after DP 1, a number of key appointments should be confirmed:

- a. **Project Manager.** Typically, the OC of a STRE.

b. **CDM Coordinator.** Appointed by the Client and typically the CO of the Works Group. This appointment may be assumed during the definition stage. The application of CDM Regulations is explained in more detail in Chapter 10 of JTTP 4-05. The guidance of the Joint Force Engineer should be sought on this appointment.

222. **User Requirement Document.** If not already done, the requirement should be developed into a User Requirement Document (URD) by the Infrastructure Staff. This is explained in Chapter 2 of JTTP 4-05. A URD is normally in a tabular format and should describe the requirement in output terms and in detail setting out the minimum standards to be achieved. It should also identify Key User Requirements (KUR) that should be based on the User's critical success criteria. The development of the URD requires detailed consultation with the User and is normally an iterative process. The MDA will advise on technical feasibility.

223. **Desktop study.** A further desktop study is carried out, including researching available information. The study should consider the findings of the definition stage, and identify key issues that need to be resolved before options can be developed for the design, construction method and delivery strategy.

224. **Tactical Infrastructure Reconnaissance.** A Tactical Infrastructure Reconnaissance (TIR) is a detailed site reconnaissance. Annex 2C provides a framework for a TIR. The TIR should be led by the Project Manager and should:

- a. Survey the site.
- b. Carry out appropriate ground investigation.
- c. Confirm and clarify the User's requirement given in the URD.
- d. Agree the location of the proposed facility through a Siting Board.
- e. Develop a concept design and consider potential construction methods.

- f. Consider potential delivery strategies.
- g. Investigate the availability of materiel and contractors.
- h. Identify arrangements for operation and maintenance after handover.
- i. Refine project risks, SHEF hazards and estimates.

225. **Availability of materiel and contractors.** A detailed investigation of the availability of materiel and contractors should be carried out during the TIR:

a. **Materiel and resources.** An assessment should be made of the availability of construction material, plant and equipment. Chapter 5 explains materiel resourcing in detail.

(1) Availability, quality and costs, including consideration of security and sustainability of sources.

(2) Typical specification means, in particular, whether imperial or metric measurements are used.

b. **Contractors.** The pool of available contractors should be constantly monitored and assessed.

(1) Availability, quality and costs.

(2) Commonly used construction techniques and any consequent safety implications?

(3) What is the general level of skill, technical ability, competence, and cost?

226. **Siting Board.** The conduct of a Siting Board is explained in Annex 4A of JTTP 4-05. For all but the most straight-forward of projects, a formal Siting Board should be arranged by the Infrastructure Staff. All those on which the project could impact should attend the Board, which should select the

preferred location for the proposed facility. The Siting Board should ideally be timed to coincide with the TIR in order to minimise unnecessary tactical movement.

227. **Design concept.** After the TIR, a ‘design concept’ can be developed based on the information gathered to date. This is an idea for a design and should represent around 20–30% of the final design solution. It should not unduly constrain either the construction method or the delivery strategy. However, it should provide sufficient detail on size and layout in order to:

- a. **Allow the user to envisage the physical form of the solution.** The design concept forms the basis of discussion with the User on how the requirement might be met. In many cases, a degree of expectation management is needed at this point.
- b. **Start the Authority Approvals process.** The design concept should have sufficient detail to engage the Approval Authorities and, where appropriate, seek provisional planning consents.

228. **Design review.** The design concept should be presented to the stakeholders at a design review meeting. Ideally, those involved in project assurance, and experienced personnel who have not been involved in the project, should also attend. The practicalities of time and distance may mean that the design review will have to be conducted during the TIR to maximise stakeholder participation. The design review is considered to be an interim DP within the assessment stage as it only seeks to endorse design development; it is not a major DP. Determining the optimal solution, the design review should:

- a. Agree the proposed concept design or recommend adjustments to it.
- b. Agree a preferred construction method.
- c. Agree a preferred delivery strategy.
- d. Note significant project risks and agree which stakeholder will control them.

- e. Identify and confirm the Authority Approvals required.

Insight 2-2: Always check with the User that the proposed solution will indeed meet his needs.

229. **Investment Appraisal and Business Case.** Although cost estimates and planning may have started earlier, during the assessment stage, the Infrastructure Staff must determine how to obtain funding for the project. This will almost certainly require the preparation of an Investment Appraisal (IA) for presentation in a Business Case (BC). This is described in detail in Chapter 13 of JTTP 4-05. For infrastructure projects on the operational estate, the Project Sponsor (usually the Infrastructure Staff), bears responsibility for producing the IA and BC. It is highly likely, however, that input will be needed from the MDA on likely Courses of Action (COA) and the risks and resources associated with them.

230. **Selection of delivery strategy.** Following the design review, the most appropriate delivery strategy should be identified. As explained in Chapter 1 of this document and in Chapter 5 of JTTP 4-05, there are a number of possible options. Broadly, these can be described as being military or contracted, or a combination of both. The selection of the delivery strategy will shape the degree of design development and the format of the design report.

- a. **Contractor design and construction.** This is only ever appropriate when several contractors are available that have the range of skills, and are capable of design and delivery. The CONLOG and ISP contractors are ideally suited to this. If Government Furnished Equipment (GFE) is required, this is less useful.

(1) **Advantages.** This minimises the input required from the MDA and is most likely to make best use of local materials and skills. It reduces the risk of confusion of responsibility for errors in the design. This COA is less constrained by MDA capacity; however, the MDA is still required to produce an output-specification.

(2) **Disadvantages.** Experience has shown that this often requires close contract supervision to ensure standards are maintained. As more risk is passed to the contractor, it *may* be more expensive.

b. **Contractor design, military construction.** This is useful when a specialist solution is proposed, such as a steel portal frame building.

(1) **Advantages.** This COA minimises the input required from the MDA and makes use of a wider range of specialist design skills that would otherwise be unavailable.

(2) **Disadvantages.** Few contractors have a requisite understanding of MCF capabilities nor of the simplicity of design required on the Operational Estate. Pre-project training likely to be required for MCF.

c. **Military design, contractor construction.** This is suitable for contractors with limited design capability. It also ensures that the design strikes the right balance between practicality, austerity and quality.

(1) **Advantages.** This COA is most likely to utilise local contractors and contribute to local economy, thereby fostering stabilisation.⁷ It also does not tie up MCF resources.

(2) **Disadvantages.** This requires considerable effort from the MDA. More work is required from the STRE in design development. It requires close contract supervision during construction.

d. **Military design and construction.** This may be required by the threat/security situation.

(1) **Advantages.** Time can be saved on specific projects by avoiding the need for a lengthy tender period and the MCF is

⁷ See Chapter 1 of JTTP 4-05. Initially it may be necessary to start with military designs until local competence is increased. Thereafter a contracted design and contracted solution is usually preferable.

quick to mobilise. This COA is therefore better suited to projects of shorter duration where this saving in time is proportionately greater. Designs are more readily prepared with the collaboration of the construction force.

(2) **Disadvantages.** Considerable design effort is required of the MDA in order to produce detailed design. The design will be constrained by MCF capability.

231. **Detailed design development.** Once the stakeholders formally agree the concept design, the MDA can continue with design development to produce a detailed design. The format and language used in the design products (drawings, specifications etc.) should be appropriate for the people and organisations that are expected to use them. A complex specification written in the standardised format that a UK contractor would recognise could be unintelligible (and unachievable) to an indigenous contractor in a developing country. The degree of design development is dependent on the intended delivery strategy:

a. **Contractor design.** In order to transfer to a contractor for the detailed design work, the MDA would *normally* (although by no means always) expand on the design concept, taking it from 5–15% to 20–40%. Care must be taken when producing this ‘indicative design’ not to unduly constrain any subsequent selection of the most appropriate construction method. The design brief should provide all the information required by the contractor in developing an appropriate detailed design and specification.

b. **Military design, contractor delivery.** A ‘detailed design’ (60–90%) and supporting specification are required as the basis on which tenders for delivery can be invited against an MDA design. A 60% design may be all that can be achieved if time constraints are significant. A less detailed design will increase project risk and require the contractor to spend more effort in design detailing during construction. Particular care should be taken in developing the specification in order to make it readily understandable, and to avoid unnecessary references to British codes and standards if others are more appropriate and with which the contractor may be more familiar.

c. **Military delivery.** A detailed design (60–90%) and supporting specification are required to allow the MCF's delivery planning to proceed. The form of specification used should be selected to suit the MCF. Again a 60% design may be all that can be achieved if time constraints are significant. A less detailed design will require the MCF to spend more effort in requesting information and design detailing during construction.

232. **Detailed design considerations.** The detailed design will consider:

a. **Project risks and SHEF hazards:**

(1) **Project risk.** A more detailed understanding of project risks should now be developed. A detailed project Risk Register should be produced that identifies the most significant risks and appropriate control measures. The responsibility for controlling selected risks should also be communicated to relevant stakeholders. Where possible, the construction method and delivery strategy should be selected to minimise these risks. Project Risk is described in more detail in Chapter 3.

(2) **SHEF hazards.** SHEF hazards should be considered afresh in light of the more detailed understanding of the project. The design team should design-out these risks wherever possible. The design report will contain an Initial Health and Safety Plan (IHSP) that provides a full list of hazards, and a risk analysis, to identify to the construction force the residual risks.

b. **Estimates.** Estimates of cost, time and manpower given in the definition stage should be reviewed and updated. Guidance on making estimates in general is given in Chapter 2 of JTTP 4-05.

(1) **Cost.** The revised cost estimate must cover the total cost of the project. Where appropriate, separate estimates should be developed for each delivery strategy considered. The design report must be structured so that cost estimates can be removed when issuing the design to contractors for tender. Chapter 13 of

JTTP 4-05 explains how cost estimates are made in support of a Business Case.

(2) **Time.** The time estimate must include separate elements for design development (if required), the planning of delivery, any tender period and mobilisation to site, as well as the time necessary for construction. This is only an indicative time estimate to inform the Infrastructure Staff or other Project Sponsor. It is not a detailed works programme to be used by the construction force. Indeed, as with estimates of cost, the design report must be structure so that time can be removed when issuing the design to contractors for tender.

c. **Value engineering.** Value engineering is the systematic improvement of the 'value' of an item of infrastructure by examining its function. Is what is planned, the most cost effective way of performing that function? Value engineering must be considered throughout design development.

d. **Authority Approvals.** The design must be given Authority Approval as and when appropriate. This is an iterative process that may require the design to be changed and re-submitted. A lack of Authority Approval should not in itself stop a project. However, continuing to proceed without them carries considerable project risk.

e. **Construction method.** The design must consider the likely construction method and the technical abilities of the construction force. Consultation and collaboration with the MCF and/or potential contractors (but only where this in no way stymies due commercial process) is strongly recommended to determine their capability and views. The design must give sufficient detail to enable construction without being over-prescriptive and constraining alternative construction methods.

f. **Resourcing materials.** The designers must take into account available materials and procurement lead times in their design. Equipment and materiel may be obtained through the Joint Support Chain (JSC) as explained in Chapter 5. The detailed design will

generate an indicative stores list to enable costs to be estimated. This must not of itself be used to procure materials. It is prudent to use the time during the assessment stage, to obtain advice from the JSC on delivery times, long-lead items and overall resourcing strategy.

g. **Planning for maintenance.** Infrastructure should be designed with its future maintenance in mind. In particular, access to plant and the availability of replacement consumables in theatre must be considered. Further, the need to train staff in the use and maintenance of the facility should be considered. If required, the necessary training should be included in the scope of work for the contractor/MCF.

233. **Detailed design report.** The output from the detailed design development will depend on the construction delivery strategy. The design report should be structured to provide information relevant to the following:

a. **Infrastructure Staff.** The Infrastructure Staff will need cost and time estimates, recommendations on the delivery strategy (if not already agreed), details of any long-lead items and Government Furnished Equipment that will require authority for release or early funding, and the identification of significant project risks.

b. **Military Construction Force.** If the use of a Military Construction Force (MCF) is planned, it will need the design details (drawings, specifications, scope of works) to plan the method of construction and prepare detailed resources lists. Stores lists and work schedules in the design report are only indicative, and require further development by the MCF during the preparation stage. The Initial Health and Safety Plan will highlight to the MCF where they need to produce method statements; the MCF also needs to understand the project risks and prepare contingency plans.

c. **Contractors.** The design products for contractors will be prepared in the form of an Invitation to Tender package. The package will contain similar information to that given to an MCF (drawings, specifications, scope of works, Initial Health and Safety Plan, project risk analysis), but may need to be presented in a simpler and clearer manner befitting a potentially non-English speaking contractor. Care

must be taken to ensure drawings only have unclassified information before being released to contractors. Contractors will require additional details of Government Furnished Equipment as they will have less familiarity than an MCF. The package will also include commercial terms and conditions, and a covering letter including notices and instructions to the tenderers. Contractors in less developed countries may need help in work scheduling, but in no circumstances should cost estimates be released.

234. **Outline Engineer Plan.** The Outline Engineer Plan (OEP) is produced by the MCF (if one is to be used). Ideally, the MCF will also take part in the TIR in order to allow concurrent activity to take place. This also helps the MCF give input into the design. Annex 2D gives a framework for an OEP.

235. **Decision Point 2 – Funding approval.** At the end of the assessment stage, a decision will be made on whether to grant financial approval and continue with to the next stage.

Section 4 – Preparation stage

236. **Overview.** The main activities during the preparation stage are the planning of construction delivery, the contract tendering (if appropriate) and the procurement of construction materials. The opportunities to incorporate any changes to the requirement reduce steadily over this period. The stage ends with the construction force ready to begin work on site.

237. **Stakeholders.** During this stage the MDA either transfers its responsibility as Project Manager to the head of the MCF, or becomes the Contract Manager. The main focus of the Infrastructure Staff becomes the monitoring of project progress.

238. **Authority Approvals.** If not already obtained, final Authority Approvals are sought.

239. **Preparing for contracted delivery.** If the work is to be delivered by a contractor, preparation is focused on the award of the contract. This is discussed in more detail in Chapter 6 of JTTP 4-05.

a. **Expression of Interest.** Selected potential contractors are asked whether they are interested in tendering for the work. If they are, this is known as an Expression of Interest (EOI). This is typically done by telephone/e-mail, but larger projects may require a more formal approach. On established operations, the MDA will hold a list of approved contractors from whom an EOI may be sought. In developing theatres, the EOI process may require potential tenderers to complete a Pre-Qualification Questionnaire (PQQ) as a means of gauging their competence.

b. **Invitation to Tender.** An Invitation to Tender (ITT) package is prepared and distributed to those contractors on the list of selected tenderers. The form and format of an ITT is set out in the standardised documents of the Deployable Works Commercial Toolkit (DWCT).⁸ The ITT package should consist of:

- (1) A covering letter including notices and instructions to the tenderers.
- (2) A technical element including, appropriate design products, an indicative delivery schedule, SHEF information and, where appropriate, details of any Government Furnished Equipment. Care should be taken to ensure drawings do not contain classified information before they are dispatched.
- (3) The commercial terms and conditions.

c. **Tenderers' site visit.** Whenever possible, a guided tour of the proposed site should be given to all tenderers soon after the ITT has been issued. The guided tour will explain the proposed project, and the answers to any questions must be given to all the tenderers so that everyone has the same information. The answer to any subsequent questions asked by a tenderer must also be provided to all others who are tendering.

d. **Tender Board.** Tenders must be returned by a specific deadline. The returned tenders are reviewed by a Tender Board, set up by the

⁸ The DWCT is prepared and maintained by the Defence Infrastructure Organisation.

MDA. Great care must be taken to ensure they are impartial, and are seen to be so. The tenders are first assessed for technical compliance with no reference to the tender price. Only once the technically compliant tenders have been filtered will the price be considered.

e. **Contract award.** The contract is awarded to the tender that is technically compliant and considered to provide the best Value for Money (VfM). This does not necessarily mean the cheapest.

240. **Preparing for military delivery.** If the work is to be delivered by an MCF, preparation is focused both on the transfer of responsibility for project management and on planning to undertake the work.

a. **Handover of Project Manager responsibilities.** The role of Project Manager will typically transfer from the MDA to the MCF. In order to ensure a smooth transition of responsibilities, a formal handover should take place at which the following are to be discussed:

- (1) The User Requirement Document, including Key User Requirements.
- (2) Key project risks.
- (3) SHEF issues (from the Initial Health and Safety Plan).
- (4) Current project issues including any known resources issues or concerns.
- (5) Continued design support including arrangements for Change Control, and any areas of unfinished design.
- (6) Planning for operation and maintenance.

b. **Detailed Engineer Plan.** Based on the Tactical Infrastructure Reconnaissance (TIR), Outline Engineer Plan (OEP), the detailed design, and its own planning, the MCF should now produce a Detailed Engineer Plan (DEP) setting out in detail how it proposes to construct

the project. A framework for the DEP is provided at Annex 2E. A copy of the DEP should be sent to the CDM Coordinator.

c. **Pre-project training.** It may be appropriate for the MCF to conduct rehearsals or pre-training on elements of the project's delivery during the preparation stage.

d. **Sub-contractors.** The use of sub-contractors by the MCF will typically be relatively small scale, although on some projects, particularly plant-heavy ones, sub-contractors have been critical to success. The MCF is responsible for tendering for appropriate sub-contractors and engaging necessary Locally Employed Civilians; contracts cannot be let without appropriate Commercial Authority. This is explained in Chapter 6 of JTTP 4-05.

241. **Construction materials and resources.** Items may not be purchased without Financial Approval. This is given at DP 2. Items of equipment and other Government Furnished Equipment will also require authority for release. This is explained in Chapter 5.

242. **Decision Point 3 – Construction approval.** The preparation stage ends when the construction force is ready to begin construction. The Project Sponsor (usually the Infrastructure Staff) must either endorse the award of the contract to the contractor, or authorise the MCF to begin work. In support of this, the CDM Coordinator must approve the contractor's/MCF's detailed SHEF plan. Whilst it is unusual for a project to terminate at this stage, it does provide a final opportunity to verify that the requirement is still needed before committing to the stage of the project when the greatest costs are incurred.

Section 5 – Implementation stage

243. **Overview.** The actual construction work takes place during the Implementation Stage. Towards the end of the stage, commissioning and preparation for Facilities Management (FM) will take place. The stage ends with the handover of the completed construction.

244. **Stakeholders.** The contractor/MCF is responsible for project management of the work. The MDA continues to provide design support to

an MCF, completing design details, approving materials and exercising change control. If a contractor is used, the MDA will usually be engaged as the Contract Manager or Theatre Designated Officer (TDO).⁹ The Project Sponsor (Infrastructure Staff) will hold the requirement, monitor progress and convene a Handover Board.

245. Contracted delivery. Following the contract award, the contractor will be mobilised to undertake the work.

a. **Contractor's plan.** Whilst the tender submission will have included an outline proposal for the work as described in the ITT, it is normal for the contract to require the Contractor to submit a detailed plan shortly after the award of the contract. The Contract Manager (normally found with an STRE) should review this plan in detail before accepting it.¹⁰ The contents of the plan, which are normally discussed at a contract pre-start meeting, should be very similar to that of the DEP described earlier. Key elements are:

- (1) Mobilisation details. To put administrative arrangements in place, establish a site office, and secure initial engineer materiel.
- (2) Final details of design.
- (3) Details of key materials.
- (4) Detailed schedule including proposed milestone payment points.
- (5) Details of the inspection, testing and commissioning plan.
- (6) Plans for O&M training for FM personnel.
- (7) Detailed SHEF Plan and Risk Register.

⁹ The Theatre Designated Officer provides in-theatre contract management for UK-based contracts and acts on behalf of a UK-based Contract Sponsor.

¹⁰ These plans are not 'approved' as this may transfer some responsibility to the MOD for the efficacy of the contractor's plans.

- b. **Resourcing.** The contractor will need to begin procuring construction materials and/or take receipt of Government Furnished Equipment. Locally procured materials may need to be approved by the MDA.
- c. **Authority Approvals.** When the contractor is responsible for detailed design, his proposals must be passed to the relevant Approval Authorities for scrutiny.

246. **Contract management.** The MDA provides contract management on all but the simplest contracts (for example, labour-only). The MDA's authorised commercial officer is known as the Works Contracts Officer (WCO).¹¹ The WCO is assisted in his contract management role by a Supervising Officer (SO). The SO is usually drawn from the MDA. The WCO (assisted by the SO) should monitor the contractor's performance from mobilisation, through construction, commissioning and handover, to the maintenance period and demobilisation. This includes confirming work has been completed in accordance with the contract in order to release payment.¹²

247. **MDA site representation.** If work is delivered using an MCF, it may be necessary for the MDA to provide a site representative, especially if there is a considerable geographic separation between the two organisations. This appointment is also known as the Design Control Officer (DCO). The Design Control Officer helps provide continuity of design concept, Change Control and the ready resolution of design issues.

248. **Construction.** Regardless of whether construction is undertaken by a contractor or MCF, or both, the following are required during the implementation stage:

- a. **Records.** A site diary should be maintained and photographs taken showing progress.
- b. **Monitoring progress.** Progress should be monitored against the schedule.

¹¹ See Chapter 6 of JTTP 4-05.

¹² Often a staged payment system is used.

- c. **Project risk management.** Project risks should be managed.
- d. **Quality.** Quality should be monitored and controlled using an Inspection and Test Plan.
- e. **Design detailing.** Inevitably some design detailing will be required during this stage. The contractor/MCF must be prepared for it.
- f. **Change control.** Change should be controlled through a formal process managed by the Design Control Officer or Supervising Officer, as appropriate. Change Control is explained in more detail in Chapter 8.
- g. **Reporting.** Regular reports should be submitted by the Project Manager on:
 - (1) Progress against schedule.
 - (2) Current and forecast expenditure.
 - (3) Project risks.
 - (4) Contractual issues.
 - (5) Change.
 - (6) SHEF issues

249. **Commissioning.** The commissioning of services should be planned before work starts as part of the Inspection and Test Plan. Best practice is to commission elements of each system as they are completed. Appropriate certification should be produced once mandatory tests have been completed by appropriately qualified personnel (for example, electrical safety certification). Commissioning should also be witnessed by the Design Control Officer or Supervising Officer, as appropriate. Ideally, the future maintenance team should also witness any commissioning.

250. **Maintenance training.** As the implementation stage progresses, the contractor/MCF must ensure that arrangements are in place for the smooth handover to the facilities management. This may require on-site training.

251. **Beneficial occupancy.** ‘Beneficial occupancy’ is the early use of a facility before formal handover. It is described in Annex 4B of JTTP 4-05. Whilst there are often sound operational reasons for considering beneficial occupancy, it carries considerable contractual and SHEF risks. For example, the handover safety checks may not be complete, thereby exposing the users to SHEF hazards; and it is often difficult to determine what damage was caused by the User or contractor. Beneficial occupancy provides a convenient excuse for a contractor not to meet the quality requirements. Beneficial occupancy should not be undertaken lightly; when required, it is wise to carry out an informal, but recorded, safety check before occupation.

252. **As-built drawings.** During the implementation stage, as construction progresses, the contractor/MCF should record what was actually built.

253. **Health and Safety File.** The as-built drawings and any maintenance information should be incorporated into the Health and Safety (H&S) File. This file is a key piece of information during the handover of the project. The complexity and effort required to prepare this file should not be underestimated. Annex 2F gives a detailed structure of the H&S File.

254. **Pre-handover site tour.** In order to ensure that the formal Handover Board runs smoothly, a pre-handover site tour is strongly recommended. Depending on the size of the project, the site tour is normally conducted about two weeks before the proposed handover date. The site tour should involve as many key stakeholders as possible. It should consider all the issues to be examined at the Handover Board, in particular it should:

- a. Inspect for defects and outstanding work, and list identified items in a provisional snagging list.

- b. Ensure that all appropriate Authority Approval are in place, such as those of the Fire Officer¹³ and Environmental Health Officer.
- c. Examine progress in preparing the H&S File complete with as-built drawings and maintenance information.

255. **Handover Board.** The Infrastructure Staff should formally convene the Handover Board on a date at which the facility is expected to be substantially complete. The Handover Board provides the vehicle for formal acceptance of the work as part of the operational estate. The Board must agree:

- a. The infrastructure meets the requirement in the agreed User Requirement Document.
- b. The infrastructure is substantially complete.
- c. A clearly defined snagging list showing all defects and outstanding work to be carried out by the contractor/MCF.
- d. Subject to completion of snagging actions, the facility can be accepted as a theatre asset by the Infrastructure Staff.
- e. After any contractor (or MCF) maintenance period, the facility and supporting documentation can be accepted by the body responsible for maintenance.

256. **Decision Point 4 – Handover.** The implementation stage ends with the decision to handover responsibility of the structure from constructor to maintainer. Project management remains in place.

Section 6 – Closure

257. **Overview.** The handover of the construction works is not the end of the project, much still remains to be done during the closure stage. This stage includes the Defects Liability period in which any defects and deficiencies are rectified by the contractor (or MCF), final payments (to

¹³ The Fire Officer is normally expected to approve the designs and then, at the end of the project, confirm that the facility meets those standards.

contractors and suppliers), closure of financial and project accounts, the finalisation of records and maintenance documentation, the start of long-term Operation and Maintenance (O&M) arrangements, and finally demobilisation/recovery.

258. **Stakeholders.** The main stakeholders in the closure stage are the contractor/MCF and the Facilities Manager. For contracted delivery, the MDA will typically continue to provide project management. If delivered through military means, the MCF will remain the lead.

259. **Defects Liability Period.** After the meeting of the Handover Board, the constructor (contractor or MCF) should fix any snags that were identified. Beyond that, a contractor is usually responsible for any defects that come to light later during a formal Defects Liability period (typically up to 12 months). Whilst no such formal period binds an MCF, it may be asked to resolve problems if it is able to do so. If not, then the facilities management may have to undertake this work. However, in the early stages of an operation it is not uncommon for an MCF to have to take on the maintenance role for many months until alternative arrangements can be made.

260. **Maintenance.** The Infrastructure Staff should ensure that the new work is transferred to the facilities management or that some other arrangements are made for its maintenance throughout the period of its use. Facilities management is described in detail in Chapter 8 of JTTP 4-05.

261. **Final payment.** Final contract payments should only be made once the Defects Liability period is complete and all of the documentation necessary for completion has been provided to an acceptable standard.

262. **Closure of accounts, audit and archiving.** Not only should the financial account be closed, so too should any engineer materiel account if one exists. This is described in more detail in Chapter 5. These accounts may be subject to audit. Project documentation should be archived in accordance with PJHQ's instructions. It is good practice to send a copy of key documents to the Technical Information Centre Royal Engineers (TICRE) for future reference.

263. Lessons Identified and post Project Evaluation. A review of the project through a Project Evaluation (PE) is considered best practice. However, a simpler process may be adopted to help capture and Lessons Identified (LI) will be appropriate. Lessons Identified should be passed to via the chain-of-command to the CAA&I.¹⁴ The requirement for a Project Evaluation is described in Chapter 12 of JTTP 4-05. As a rule-of-thumb, larger or unusual projects, for which a Planned Maintenance Programme is appropriate, should have a full Project Evaluation. The aim of a Project Evaluation is to evaluate project success, identify lessons, and to make recommendations on how to improve similar projects in the future.

264. Decision point 5 – Closure. DP5 is the final decision point of the project. The Project Sponsor (Infrastructure Staff) authorises the closure of the project when it is content that the following actions have been taken:

- a. All actions identified at the Handover Board have been completed.
- b. Any Defects Liability period is complete, and appropriate maintenance arrangements are in place.
- c. All safety and maintenance information, including, for example, the H&S File, and as-built drawings, are in place.
- d. Accounts have been closed.

¹⁴ The Competent Army Authority and Inspectorate, HQ EinC(A).

Annex 2A – Option study

2A1. **Purpose.** An option study can be initiated at any stage of the project where a choice exists between a number of options and an optimal solution has to be determined to guide further project development. It is most likely to be required at the definition stage in order to assess and compare alternative options for large/complex projects in order to determine the way ahead. An option study can be presented in the form of a submission.

2A2. **Essential content.** The minimum essential content is:

- a. Background.
- b. Consideration of issues for each option in turn:
 - (1) Time.
 - (2) Quality of work.
 - (3) Finance.
 - (4) Resources available.
 - (5) Climatic conditions.
 - (6) Priority of work.
 - (7) Communications.
 - (8) Restrictions.
 - (9) Environmental impact.
 - (10) Protection.
 - (11) Local customs.
 - (12) Delivery strategies.

(13) Outline schedule.

c. Recommendations.

2A3. **Sources of information.** Depending on the stage of the project, likely sources of information will include the Statement of Requirement and/or the User Requirement Document.

Annex 2B – Operational Infrastructure Recce Report

2B1. **Purpose.** The purpose of the Operational Infrastructure Recce (OIR) Report is to provide a design estimate for the scope of work, timings and costs for the project in order to inform DP 1. The OIR Report may be presented as an engineer report or as an option study.

2B2. **Essential content.** The essential content required is as follows:

- a. Aim.
- b. Requirement, including Statement of Requirement.
- c. Location.
- d. Preliminary site investigation.
- e. Scope of the project.
- f. Initial estimates:
 - (1) Human resources.
 - (2) Time.
 - (3) Materials.
 - (4) Plant and equipment.
 - (5) Administration.
 - (6) Costs.
- g. Master Data and Assumptions List.
- h. Initial Risk Register
- i. Health and Safety.

- j. Recommendations.
- k. Summary of action required.

2B3. **Optional content.** Optional additional content, which may be considered:

- a. Climate.
- b. Local factors.
- c. Guidance for the Tactical Infrastructure Reconnaissance (TIR) party.
- d. Military and civil agreements.
- e. Sustainability considerations.
- f. Conduct of the OIR.

2B4. **Sources of information.** Depending on the stage of the project, likely sources of information will include the Statement of Requirement and/or the User.

2B5. **Project assurance checklist.** Issues for consideration as part of the project assurance process include:

- a. The Statement of Requirement should be agreed, and signed, by the User.
- b. The OIR should provide the Infrastructure Staff with the information necessary to decide whether to proceed with the project.
- c. The OIR should recommend a broad way ahead.

Annex 2C – Tactical Infrastructure Recce Report

2C1. **Purpose.** The purpose of the Tactical Infrastructure Recce (TIR) Report is to present a detailed design ready to be constructed either by a Military Construction Force (MCF) or contractor. The TIR Report must find a balance between justifying the design development, and presenting the design and management information.

2C2. **Essential content.** The essential content required is:

- a. Introduction.
- b. Aim.
- c. Justification of design development:
 - (1) Requirement (including copy of User Requirement Document).
 - (2) Constraints.
 - (3) Design factors.
 - (4) Refined and updated Master Data and Assumptions List (MDAL).
- d. Detailed design:
 - (1) Drawings.
 - (2) Scope of works.
 - (3) Specifications.
 - (4) Refined and updated Risk Register.
 - (5) Initial Health and Safety Plan (IHSP).

- e. Management information:
 - (1) Refined cost estimate.
 - (2) Refined time schedule (indicative only).
 - (3) Resources, including:
 - (a) Specified long lead items.
 - (b) Indicative stores lists.

2C3. **Optional content.** Optional content includes:

- a. Reconnaissance data.
- b. Sustainability considerations.
- c. Conduct of recce.

2C4. **Sources of information.** Depending on the project, these may be:

- a. Operational Infrastructure Recce, including Statement of Requirement.
- b. User consultation, particularly to develop the User Requirement Document.
- c. Design guides and Authority Approvals.
- d. Outline Engineer Plan, if available.

2C5. **Project assurance checklist.** Issues for consideration as part of the project assurance process include:

- a. The TIR Report must provide all the necessary information to allow the MCF to develop its Detailed Engineer Plan.

- b. The TIR Report should clearly identify which of its contents are definitive (for example, design) and which are indicative and require further development by the MCF (such as, schedule, materiel list and cost estimate).

- c. The TIR Report will almost always be published before the Detailed Engineer Plan. Although much of the Detailed Engineer Plan can be written concurrently with the TIR Report, a substantial part of it can only be finalised once the TIR Report is issued.

Annex 2D – Outline Engineer Plan

2D1. **Purpose.** The purpose of the Outline Engineer Plan (OEP) is to act as a warning order for the potential construction task and anticipate work required in the preparation stage by the Military Construction Force (MCF). The OEP is considerably less dependent on the Operational Infrastructure Recce (OIR) Report in comparison to the relationship between the Tactical Infrastructure Recce (TIR) Report and the Detailed Engineer Plan; the OEP can be written concurrently with the OIR Report by the MCF representative on the OIR.

2D2. **Essential content.** The essential content required is:

- a. Introduction.
- b. Scope of the work (likely tasks).
- c. Construction techniques involved.
- d. Manpower required and scope to use sub-contractors and labour.
- e. Materiel resourcing issues, especially long-lead items and specialist equipment.
- f. SHEF concerns.
- g. Trade requirements which may initiate reallocation of manpower or pre-project training.
- h. Administrative issues relevant to deployment to, sustainment at, and recovery from the site. The need for an advance party should be identified.

2D3. **Sources of information.** If they are not written concurrently, the OIR will inform the OEP.

2D4. **Project assurance checklist.** Issues for consideration include:

- a. The OEP should act as a warning order to the MCF in advance of the TIR.
- b. The OEP should initiate pre-project planning, and possibly long lead training.
- c. The OEP should engage the supply chain.

Annex 2E – Detailed Engineer Plan

2E1. **Purpose.** The purpose of the Detailed Engineer Plan (DEP) is to set out how the Military Construction Force (MCF) intends to execute the task. It is normally written by the MCF after the Tactical Infrastructure Recce (TIR) Report has been completed. Although much of the DEP can be written concurrently with the TIR Report, a substantial part of it can only be finalised once the detailed design is issued as part of the TIR Report.

2E2. **Essential content.** The essential content required is:

- a. Introduction.
- b. Aim.
- c. Plan for Confirmatory Reconnaissance (CR).
- d. Detailed plan for pre-project training (if not already covered by OEP).
- e. Deployment plan (including composition and tasks for the advance party).
- f. Materiel resourcing including:
 - (1) Detailed materials list (calculated from design drawings).
 - (2) Plant and equipment list.
 - (3) Plans for materiel procurement.
 - (4) Arrangements for materiel accounting and LVLP records.
- g. Construction plan including:
 - (1) Detailed delivery schedule.
 - (2) Troops to task.

- (3) Use of sub-contractors/local labour.
 - (4) Arrangements for project control.
 - (5) Inspection and test plan.
- h. Construction Safety Plan, including detailed method statements, the medical plan, etc. The way in which the H&S File will be compiled should also be planned and approved by the CDM Coordinator prior to construction.
- i. Commissioning.
- j. As appropriate, planning for the maintenance period and/or to train operation and maintenance personnel.
- k. Finance:
- (1) MCF's cost estimate.
 - (2) Anticipated expenditure profile.
 - (3) Financial accounting.
- l. Project Risk Register.
- m. Recovery.
- n. Conclusions and recommendations (if required).
- o. Summary of action required

2E3. Sources of information.

- a. Tactical Infrastructure Reconnaissance.
- b. Outline Engineer Plan.

- c. Tactical Infrastructure Reconnaissance (TIR) Report.

2E4. Project assurance checklist. Issues for consideration include:

- a. Check that pre-project training is appropriate and has been completed.
- b. Check that the construction force has appropriate numbers of competent tradesmen.
- c. Check that long lead items have been procured.
- d. Check that appropriate financial and contractual delegations are in place.
- e. Check that the MDA Site Representative is incorporated into the construction team.
- f. Check that the works schedule is realistic and deliverable.
- g. Check that the project risks are understood and contingency plans have been considered and properly resourced.
- h. Check that the Construction Safety Plan has been submitted to the CDM Coordinator for approval.

Annex 2F – Health and Safety File

2F1. **Purpose.** The purpose of the Health and Safety (H&S) File is to provide information needed to enable future work to the facility to be conducted in a safe manner. This includes cleaning, maintenance, alterations, refurbishment and demolition. The H&S File provides information about what has gone into the construction during its life. This may include, for instance, the materials, the method or sequence of the construction and the design calculations. The information in the H&S File should alert any future workforce to the health and safety risks that will be encountered and help them to develop their Health and Safety Plans. The information in the file must be relevant to the health and safety of any future construction work. The file is not a maintenance manual; the inclusion of too much maintenance detail is likely to result in the key health and safety information being buried. Maintenance information should be grouped into a Maintenance data pack.

2F2. **Content.** Content should include:

- a. A brief description of the work carried out.
- b. Key structural principles (for example, bracing, sources of substantial stored energy, including pre- or post-tensioned members) and safe working loads for floors and roofs, particularly where these may preclude placing scaffolding or heavy machinery there.
- c. Any residual hazards which remain and how they have been dealt with, for example, surveys or other information concerning asbestos, contaminated land, water bearing strata, and buried services.
- d. Hazardous materials used, for example, lead paint, pesticides, and special coatings which should not be burnt off.
- e. Information regarding the removal or dismantling of installed plant and equipment, for example, any special arrangements for lifting, the order of, or other special instructions, for dismantling.
- f. Health and safety information about equipment provided for cleaning or maintaining the structure.

- g. The nature, location and markings of significant services, including underground cables, gas supply equipment, and fire-fighting services.
- h. Information and as-built drawings of the structure, its plant and equipment, for example, the means of safe access to and from service voids, and fire doors and compartmentalisation.
- i. Testing and inspection certificates for the installation should be included in the H&S File, which should include.
 - (1) Foul drainage above ground.
 - (a) Pipework tests.
 - (b) Syphonage and back-pressure tests.
 - (2) Drainage below ground.
 - (a) Water/air testing of gravity drains.
 - (b) Water testing of manholes.
 - (3) Hot and cold water supplies.
 - (a) Hydraulic pressure of pipework.
 - (b) Disinfection (chlorination and microbiological water analysis).
 - (4) Heating systems.
 - (a) Hydraulic pressure of pipework.
 - (b) Commissioning certificate.
 - (5) Electrical installation testing and inspection certificates.

2F3. Project assurance checklist. Issues for consideration as part of the project assurance process include:

- a. Key risks should be clearly identified, not hidden in detail.
- b. The H&S File must be appropriate for the operation and maintenance organisation who will receive it.
- c. The H&S File must be approved by the CDM Coordinator, who will submit it to the Infrastructure Staff. The Infrastructure Staff will forward it to the facilities management, who is likely to pass it to the operation and maintenance provider.

Annex 2G – Project Final Report

2G1. **Purpose.** The purpose of the Project Final Report (PFR) is to highlight any problems faced during the project, and lessons identified, so that this knowledge can be passed on to subsequent project teams to aid them in completing future projects.

2G2. **Essential content.** The essential content required is:

- a. Data on manpower, plant and project finances.
- b. Construction process.
- c. Outstanding issues.
- d. Lessons identified.
- e. Recommendations for future projects.

2G3. **Optional content.** HM Treasury Central Unit on Procurement Guidance Note No.43 *Project Evaluation*, provides a detailed list of issues that can be considered in a Project Evaluation (PE).

2G4. **Sources of information.** The following sources of information can be used to complete the PFR:

- a. Site diaries.
- b. Health and Safety File.
- c. Financial records.

2G5. **Project assurance checklist.** Issues for consideration include:

- a. The LANDSO 1118 format should be used.
- b. Detailed lessons identified should be consigned to annexes.

Chapter 3 – Project risk

301. **Project risk management.** The Association for Project Management (APM) defines project risk management as a: *structured process that allows individual risk events and overall project risk to be understood and managed proactively, optimising project success by minimising threats and maximising opportunities.*

302. **Project risks and opportunities.** A risk is an uncertain event that, should it occur, would have a detrimental effect on the achievement of one or more project objectives, for example, a delay, or increased cost. Conversely, an opportunity is an event that would have a positive effect.

Insight 3-1: Do not confuse risks to the project (project risk) with risks to life and limb (SHEF risk).

303. **Subjective and objective assessment.** Whilst every effort is made to measure risk and articulate it objectively, there is inevitably a subjective element to the assessment. This must be borne in mind when interpreting risk assessments.

Insight 3-2: Be cautious of any risk assessment that is quoted with a high degree of accuracy or 'confidence level'.

304. **Perspective.** Often, assessments of project risk become confused as to the perspective they should take. The project risks as seen by a contractor (for example, will he be paid for work?) are not necessarily those that concern the Project Sponsor (for example, might he have to pay for another contractor to replace the current one if he fails?).

Insight 3-3: The Project Manager must be sure to articulate risk from the point of view of the Project Sponsor.

305. **Risk management process.** The Project Manager maintains the risk management process throughout the project. Figure 3.1 shows a generic project risk management process.

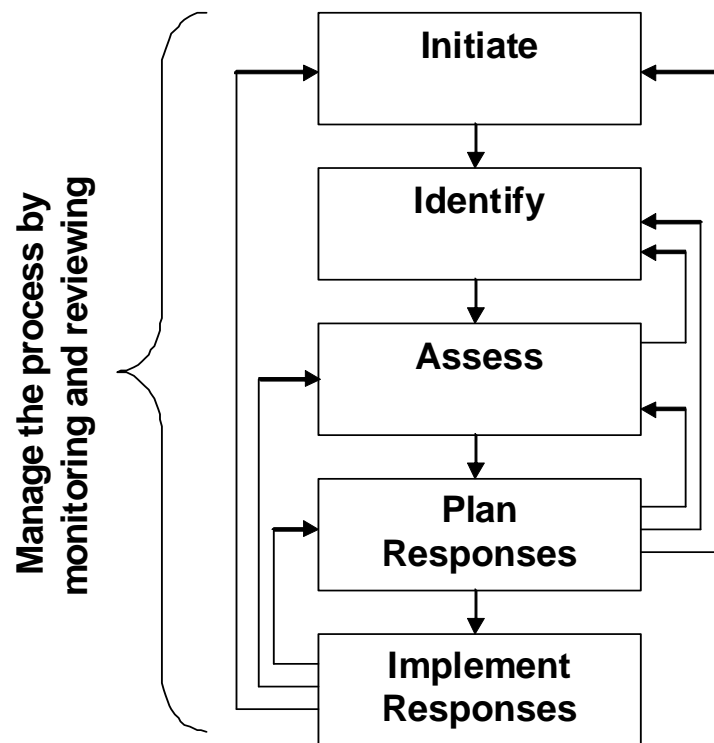


Figure 3.1 – Generic risk management process

- a. **Initiate.** Set up a risk management process that is appropriate to the project overall and the particular stage of the project life cycle. Do not over-complicate it.
- b. **Identify.** Identify risks and confirm that they are real. Record them on a Risk Register.¹
- c. **Assess.** Examine the risk in sufficient detail to enable appropriate and effective decisions to be taken to manage the risk.
- d. **Plan responses.** Determine the appropriate response to individual risk events. The responses will be influenced by a number of factors, such as the impact that the risk may have on TCQ, its probability, the cost and availability of a resources with which to

¹ Typically a Risk Register lists the risk, who ‘owns’ it and what is being done about it.

respond, and the likelihood of secondary risks as a result of the response.

(1) **Risk responses.** There are four main strategies for dealing with risk:

(a) **Avoid.** Find a different way of doing things.

(b) **Reduce.** Control the risk by design, management or other means to reduce it to an acceptable level. This mitigation can be of the risk's likelihood and/or impact.

(c) **Transfer.** Risks can be transferred up the chain-of-command; this can be a useful prompt to release the resources required to reduce the risk instead.

Contractually, risk may be transferred to the contractor. However, this inevitably comes at financial cost.

(d) **Accept.** This is only acceptable if the risk is low or there is no other way of dealing with the risk. It is important to communicate to the chain-of-command just how much residual risk is being carried.

(2) **Opportunity responses.** Similarly there are four ways to respond to an opportunity. These tend not to be managed in as formal a way as risks. However, doing so is considered best practice, particularly on larger projects.

(a) **Exploit.** How can the benefits be realised?

(b) **Enhance.** How can the benefits be maximised?

(c) **Share.** If they are shared, can they become an incentive for improved performance?

(d) **Accept.**

- e. **Implement responses.** Ensure the responses are acted upon, particularly by those who assessed to be the owners of the risks.
- f. **Monitor and review.** The risks should be reviewed during project meetings.

305. **Communicating risk to support decision making.** Risks should never be taken blindly. The degree of risk associated with a course of action must be clearly and unambiguously stated. There are a number of ways in which this can be done. Simple graphical tools are often the best. Figure 3.2 shows a risk matrix through which the likelihood and impact of a number of risks are quantified. Expressing risk through this 5x5 matrix is considered to be best practice; nevertheless, any practical tool may be used.

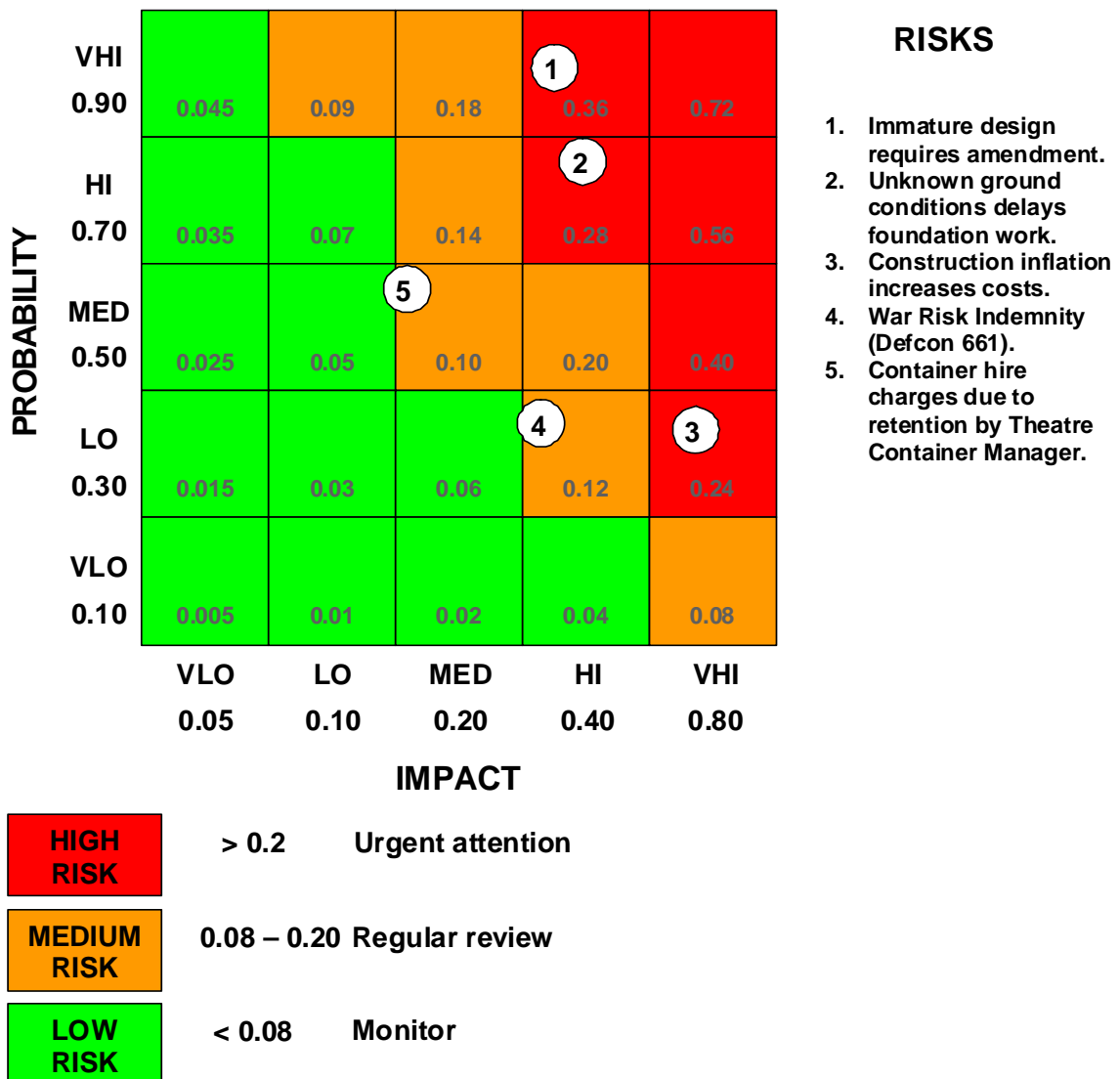


Figure 3.2 – Example of a risk matrix used to convey project risk

306. **Communicating risk for financial planning.** When preparing an Investment Appraisal or Business Case, a financial allowance for risk is expected. The project Risk Register can be used to identify a risk, and set aside and, objectively calculated some of money against that risk. Annex 13C of JTTP 4-05 shows how this is then used to make a three-point cost estimate to establish the appropriate financial allowance to make for project risk.

Chapter 4 – Scheduling

401. **Scheduling.** Scheduling is the process of determining when, and for how long, project activities should happen, and when the overall project will start and end. This includes identifying activities, their durations and logical dependencies, whilst taking account of the resources they require. A project schedule is a timetable for the project, which shows how milestones and/or activities inter-relate over a period of time.

402. **Identifying project activities.** The first step in scheduling is to break a project down into its constituent activities. All project work is progressively sub-divided until the requisite level of detail is reached. This level of activity becomes the building block of the project schedule. A group of related activities may be aggregated into a Work Package. A Work Breakdown Structure (WBS) is a logical, structured, hierarchical way in which project activities/Work Packages can be identified. Everything in a WBS should be a *verb*, not a *noun*. A WBS also provides a logical structure for project control systems. Figure 4.1 shows a very simple WBS.

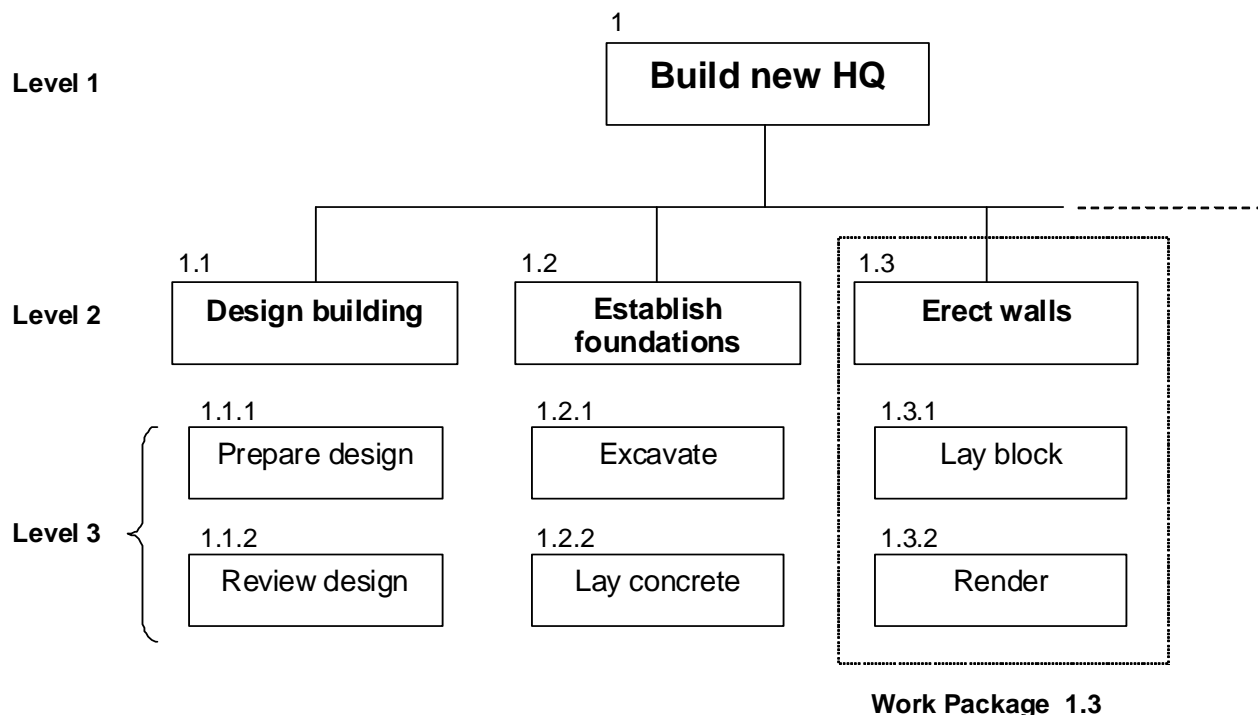


Figure 4.1 – Work Breakdown Structure

403. **Activity dependency.** As the activities are identified, their inter-relation must be established, for example, foundations built before the walls are erected. The three most common logical dependencies are:

- a. Finish to Start (FS): activity B cannot start until activity A has finished.
- b. Start to Start (SS): activity B can only start after activity A has started.
- c. Finish to Finish (FF): activity B can only finish after activity A has finished.

404. **Network Diagram.** A Network Diagram is a simple form of schedule and is one of the clearest methods of showing the inter-dependencies of activities/Work Packages. Each activity is drawn simply as a box in which is recorded the activity (or its WBS identification number) and its duration. Although not essential, the resources required, and the earliest/latest start/end may also be recorded. Figure 4.2 shows a simple Network Diagram.

Activity	Duration (days)	Dependency
A	1	
B	4	Follows A
C	2	Follows A
D	3	Follows B
E	1	Follows B
F	4	Follows C
G	5	Follows D
H	3	Follows F
I	1	Follows F
J	3	Follows G
K	1	Follows E and H
L	2	Follows I
M	1	Follows J, K and L

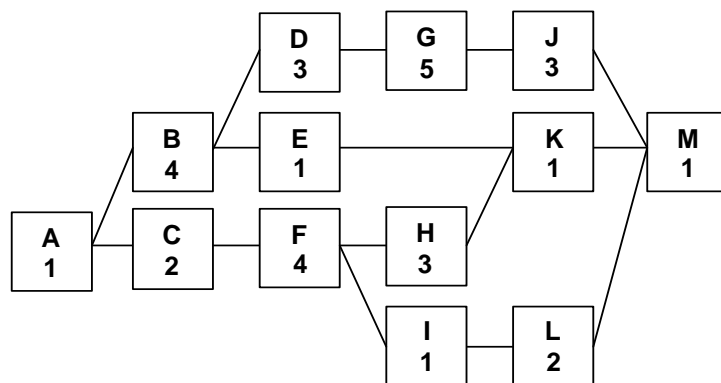


Figure 4.2 – Simple Network Diagram

405. **Gantt chart.** The information in a Gantt chart is the same as that in a Network Diagram. Most project management software tools allow the user to draw-up the schedule as a Gantt chart *and* Network Diagram; both are also

easily drawn by hand. On major projects it is common to use the network for managing the schedule and the Gantt for displaying the information. The information shown by a Gantt chart is easily understood if there are only 20-30 bars (or milestones). However, beyond that, the information becomes harder to discern. Considerable thought needs to be given to the structure of the charts on more complex projects. Activities may need to be 'rolled-up' into Work Packages in order to retain clarity. Figure 4.3 shows a simple Gantt chart.

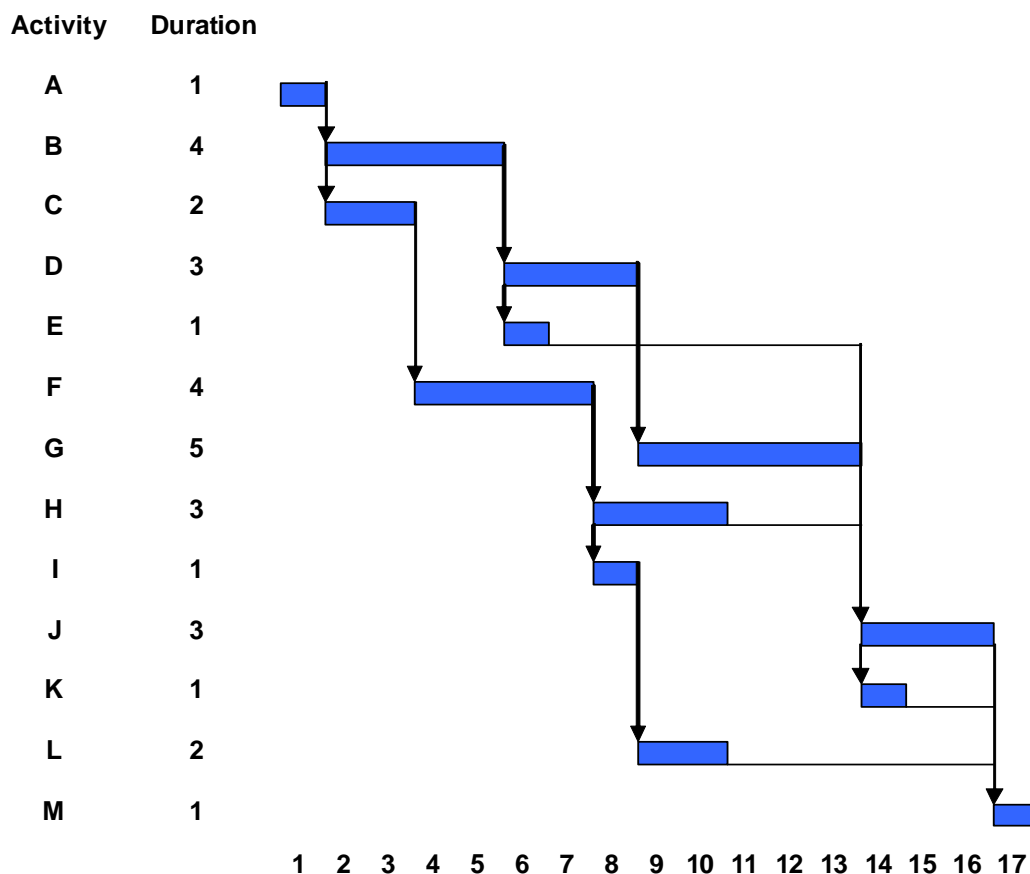


Figure 4.3 – Gantt chart

Insight 4-1: A Gantt chart can be extremely useful even for projects lasting just a few days and delivering battlefield, as opposed to campaign infrastructure. It helps tired minds to clarify the project schedule and allows detailed monitoring and reporting of progress. More importantly, it allows the early identification of problems that may lead to a delay in completion.

406. **Critical Path Analysis.** The ‘critical path’ in a schedule is the sequence of activities in a project, any delays to which will result in a delay to the overall project. ‘Float’ on the other hand, is the delay that may occur to activities without effecting the overall project duration. Activities on the critical path, by definition, have no float. There is always one critical path, but there may be many. Critical Path Analysis (CPA) is the process of identifying the critical path and calculating the float within the schedule. CPA is often carried out using a network diagram. Figure 4.4 is an expansion of Figure 4.2 and shows how Network Analysis supports CPA.

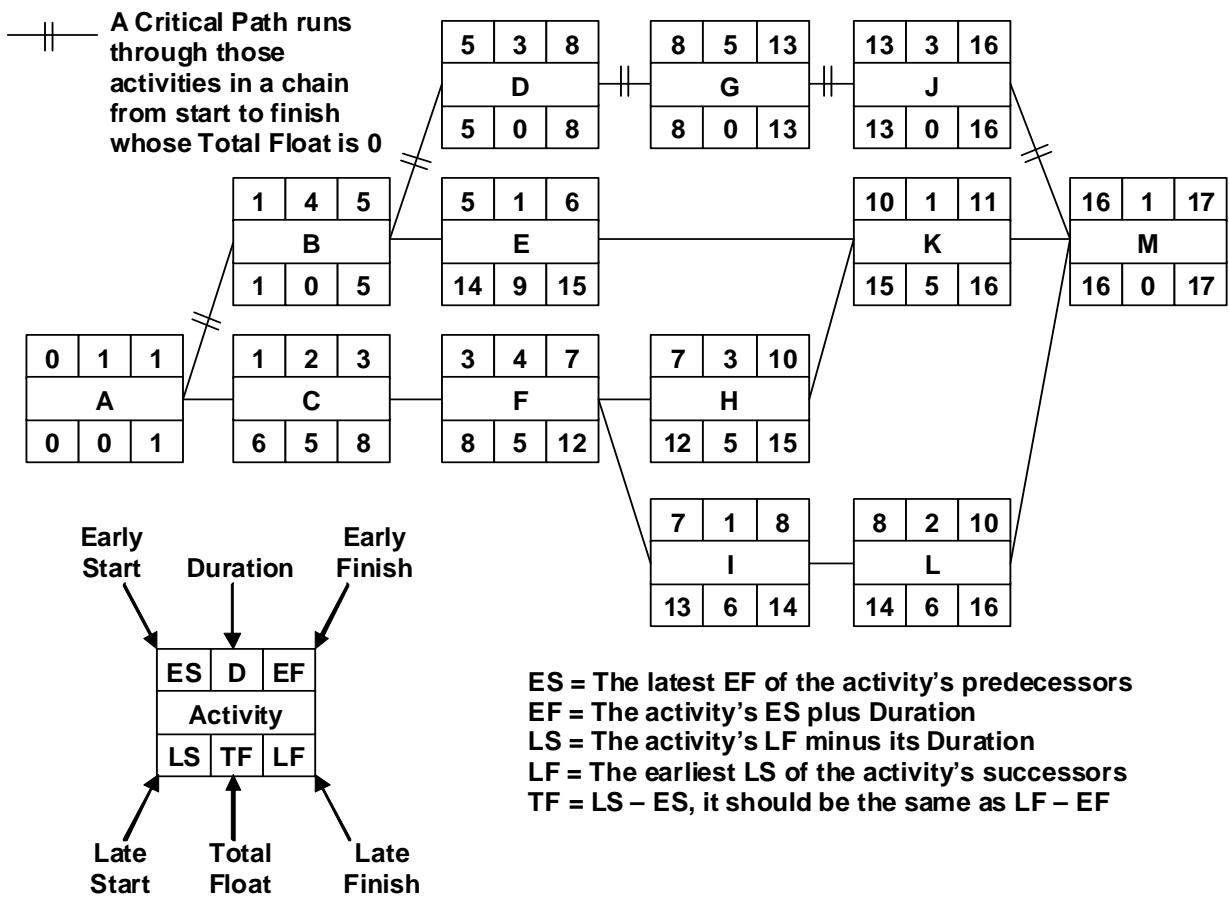


Figure 4.4 – Network diagram used for Critical Path Analysis

a. **Forward pass.** The earliest time it is possible to start and finish each activity is calculated by working from the project start and moving forward. These dates/times are known as Early Start (ES) and Early Finish (EF).

- b. **Backward pass.** Conversely, beginning at the end of the project and moving backwards, the latest time it is possible to start each activity, and still not compromise the project end date, can be calculated. These dates/times are known as Late Start (LS) and Late Finish (LF).
- c. **Total Float.** The Total Float of an activity is the difference between its early and late time, either $(LF - EF)$ or $(LS - ES)$. It is the amount of spare time available in which to complete the activity without it coming onto the critical path.
- d. **Free Float.** Free Float (FF) is the amount of time a single activity can be delayed or extended without affecting *the next activity*. This is not necessarily how much it may be delayed without affecting the project end date. It is calculated by taking the activity's Early Finish from the successor activity's Early Start ($FF = ES$ [successor activity] $- EF$). Free Float is not often quoted as it can easily be confused with Total Float. However, it is used when resource levelling and smoothing.

407. **Resource smoothing and levelling.** Often the physical resources¹ available to a project may be constrained or have a limiting value, especially in places such as tactical bases or other locations to where manpower and construction equipment is hard to mobilise. The project schedule may therefore have to be adjusted to take this into account. Resource histograms associated with the activities in the schedule help visualise resource usage across the project from a time-based perspective (for example, day-by-day). Stretching activities out, delaying them, or splitting them up can help reduce the peak demand for a specific resource. Figure 4.5 is a simple graphical example of resource smoothing and levelling.

- a. **Resource smoothing.** Resource smoothing is also known as time-limited scheduling. Peaks in resource requirements are reduced as much as possible, with the caveat that the end of the project date must be preserved. Activities may be lengthened or broken up; this takes up the Free Float associated with the activity. However, even after resource

¹ Not funds.

smoothing, the requirement for resources may still exceed their availability.

b. **Resource levelling.** Resource levelling is also known as resource-limited scheduling. The project end date may be delayed to ensure that resources peaks do not exceed a specified limit.

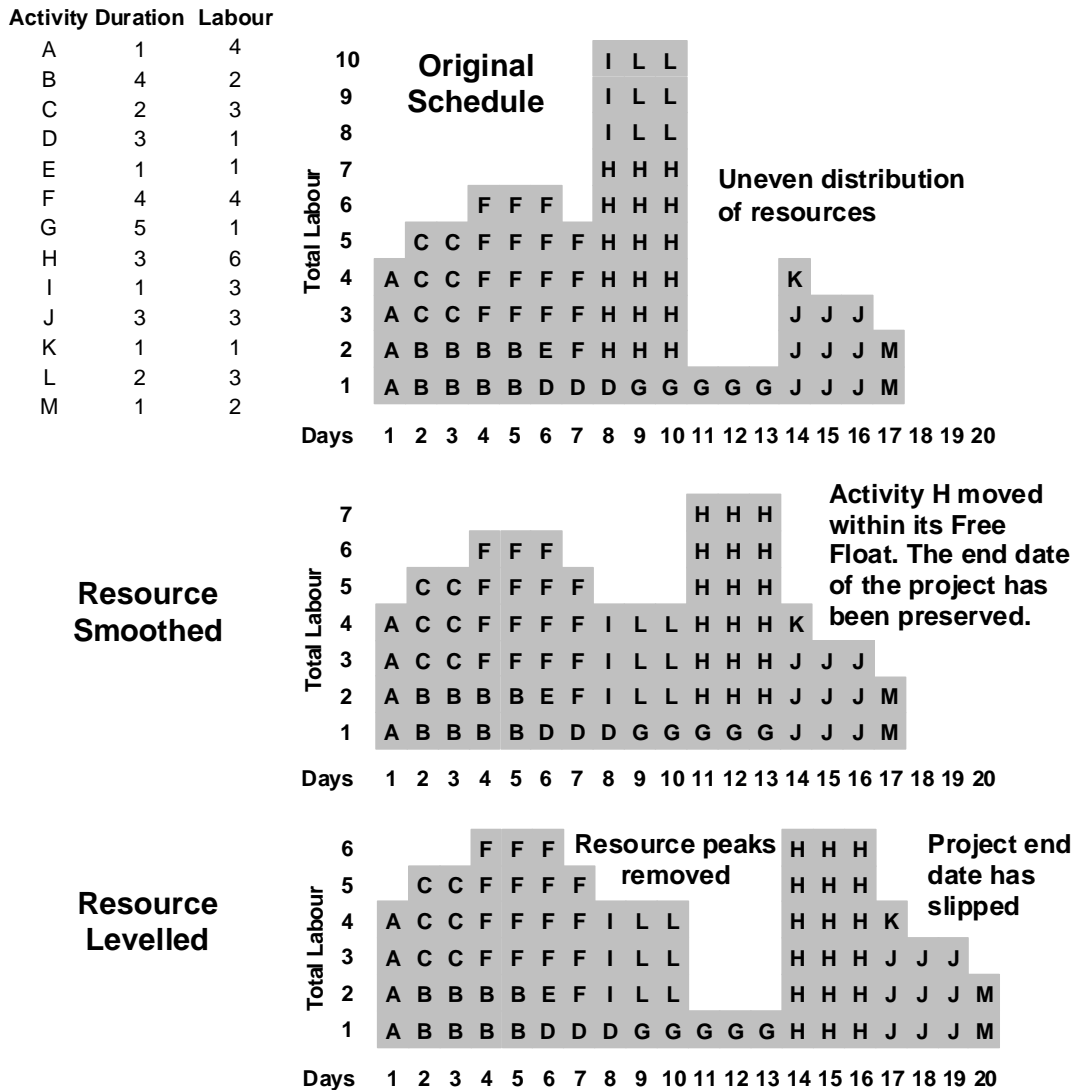


Figure 4.5 – Resource histograms showing resource levelling and smoothing

Chapter 5 – Resourcing materiel

501. **Resourcing.** Obtaining materiel for construction is known as ‘resourcing’. Whilst all equipment¹ is obtained through the Joint Supply Chain (JSC), most of the basic consumable items are often obtained locally. As explained in Chapter 1, project success depends on the integration of resource planning into the overall project plan. This Chapter explains how material resources are obtained and paid for so that a project may be efficiently and cost-effectively planned.

Insight 5-1: It is important to know where all the materiel comes from, how to pay for it and how to ensure it gets to where you need it. It is essential that the resourcing strategy for a project is sound.

502. **Military and civilian sources of materiel.** As shown in Figure 5.1, materiel for both contractors and a Military Construction Force (MCF) can come from both military and civilian sources.

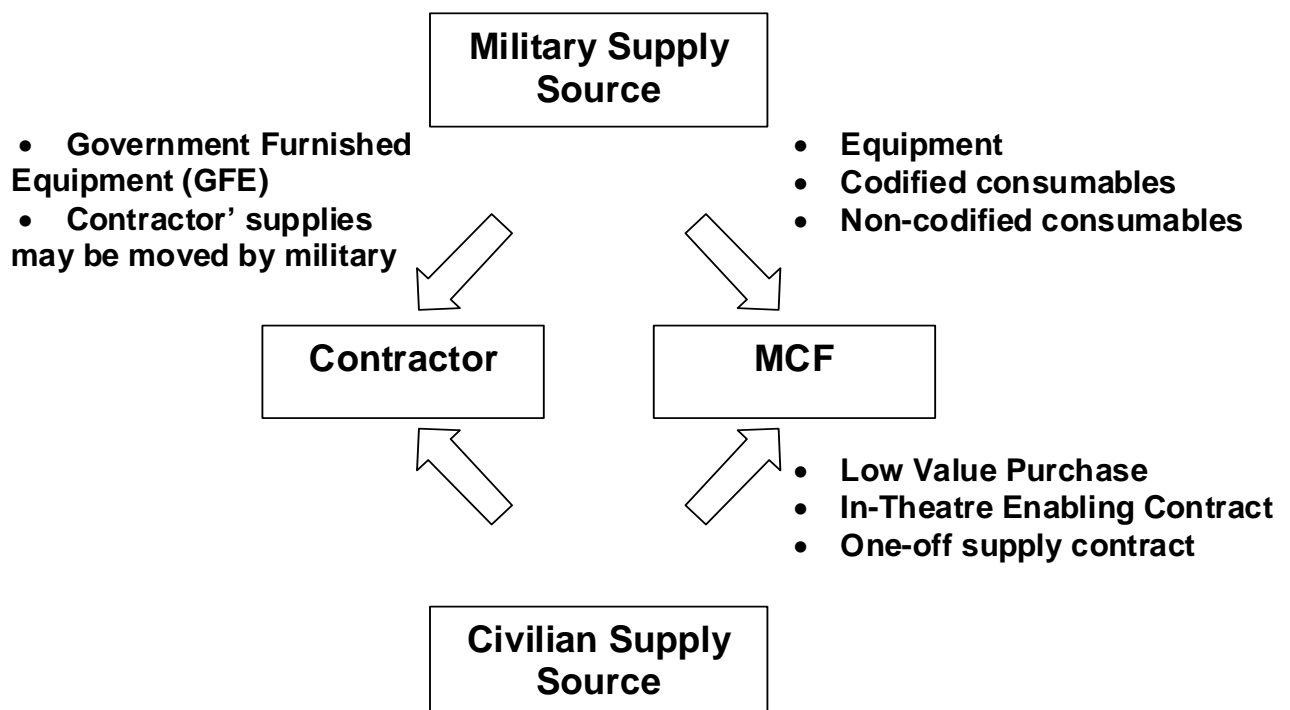


Figure 5.1 – Military and civilian supply sources

¹ See Chapter 3 of JTTP 4-05.

a. **Equipment, codified and non-codified stock.** Equipment is held against a formally established liability. It is issued on the presumption that it will be returned. Consumable stock items are not.² Many equipment and consumable stock items are recognised on the base Logistic Information System (Log IS) by a unique designating number, the NATO Stock Number (NSN); those consumable items that are not, are simply 'non-codified'.³

b. **Government Furnished Equipment.** Government Furnished Equipment (GFE) is supplied to a contractor when the requirement is best met by a piece of issued equipment (or consumable item). For example, the contract may be to build a camp, where the accommodation is provided by an Improved Tented Camp (ITC).

c. **Moving contractor supplies through the Joint Supply Chain.** In some operational circumstances it may be necessary to move stock for a contractor. This transfers liability for project delay due to late delivery of material, from the contractor to the MOD. It should be avoided unless the *real* benefits to the project outweigh this *potential* risk. Indeed, it is often more important to ensure that the items get to site on time and that consequently the project is delivered rapidly. Furthermore, material moved outside the JSC is subject to normal customs clearance, this can cause delay and increase cost. Case-by-case consideration is not only pragmatic; it is common sense.

503. **How infrastructure resources enter the supply system.** The way in which infrastructure resources enter the JSC has implications for the cost of the project and the project schedule's vulnerability to delays in supply. The 'Purple Gate' (PG) concept is a process to: *ensure the regulation of materiel flow into the JSC for the sustainment of Operational Theatres.*⁴

² There are a number of criteria to be met before items may be classified as consumable stock. From an infrastructure point of view the items must be less than the value of an 'asset' (ca £25k), non-repairable and likely to be consumed within a specified period of time.

³ Often referred to as Not-in-Vocab(ulary) (NIV).

⁴ JSP 886, *The Defence Logistics Support Chain Manual*, Volume 3 *Supply Chain Management*.

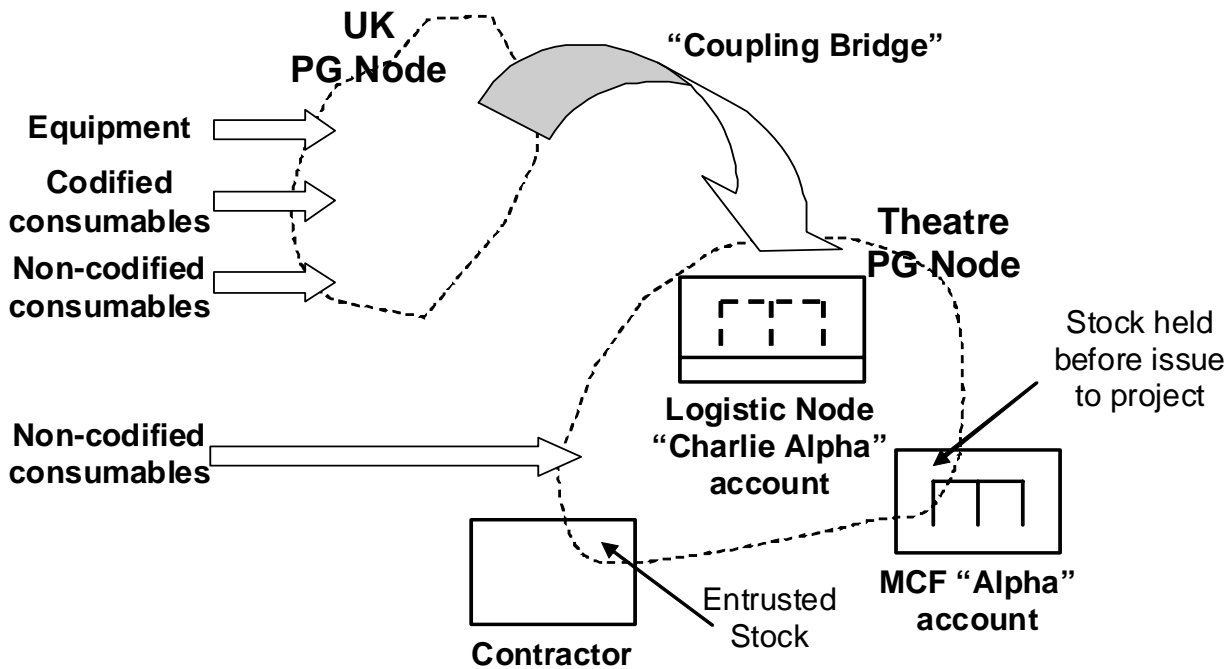


Figure 5.2 – Infrastructure Resources in the Joint Support Chain

- a. **Point of entry.** Equipment and codified consumables enter the JSC in the UK. Non-codified items may enter in the UK or in Theatre. Defence Support Chain Operations and Movements (DSCOM) works with PJHQ to move the items through the Coupling Bridge to the theatre Purple Gate node following the priorities determined by theatre. Items for a project are almost invariably grouped with any number of other items to form an efficient consignment for movement by land, sea or air. This aggregating of stores will effect when those required for the project can be despatched. Conversely, not only can non-codified items be delivered directly to the theatre Purple Gate node, it may also be possible to have them delivered directly to site.

Insight 5-2: The cost of strategic transport of materiel through the coupling bridge for a specific project may be high; however, it is impossible to determine. This must be borne in mind when preparing a business case as it may make it impossible to compare costs of different courses of action on an equitable basis. Nor can the true cost of a project be determined.

Insight 5-3: By using locally procured consumables, a more accurate resource cost can be established. This may be significant if the work is undertaken on a repayment basis.

Insight 5-4: Because theatre maintains the priority list for the supply of items into theatre, it is prudent to ensure that the Theatre Movements Staff are aware of the urgency of specific project supplies.

- b. **Entrusted stock.** Although they are in-theatre, those items of Government Furnished Equipment that are considered to be still in the Joint Supply Chain and are held as such *by a contractor* are known as entrusted stock. The use of entrusted stock is explained in Chapter 8 of JTTP 4-05.

Insight 5-5: Because consignments of entrusted stock are often marked for delivery to a contractor, individuals in the Joint Supply Chain often mistakenly assume that they *belong* to the contractor. This has led, in the past, to important supplies being removed from consignments to *make way for military supplies*. Periodic re-education is often required.

- c. **Consumption.** When items arrive in the theatre Purple Gate node, they are usually held by a logistic unit with a 'Charlie Alpha' UIN account. This means that the stock is still held in the JSC but recorded against the specific Operation. Some Log IS⁵ also allows this stock to be held by a unit with an 'Alpha' UIN account (a *normal* unit). The item is then held until *issued* to the project. At that point the High Level Budget (HLB) that owns the unit, it is billed for the cost of the consumable item.

⁵ Management of the Joint Deployed Inventory (MJDI).

Insight 5-6: Regardless of on whose behalf the infrastructure is provided, or how the overall project is being funded, the Top Level Budget (TLB) of the construction unit that *consumed the stock* is charged the cost of codified consumable items.

504. **Operational demand process.** Chapter 1 of JTTP 4-05.1

Compendium of Equipment Infrastructure gives a detailed flow diagram that explains the operational demand process. Infrastructure stores' demands are processed by the Engineer Logistics Management Cell (ELMC) within Joint Supply Chain (Services). Each demand sent to them should have a Required Delivered Date (RDD). Early liaison with ELMC will help determine the most effective resourcing strategy.

- a. **Delays in procuring large quantities.** As explained below, either through a single large quantity demand, or the cumulative effect of repeated requests for a specific item might cause a problem with an existing Enabling Contract (see below). Alternatively, the quantity demanded may exceed the authorised stock level, in which case specific Financial Approval may be required by DE&S to support their procurement. Early warning will reduce the impact on the project.
- b. **Long-lead items.** Some items take a long time to obtain from a supplier. ELMC can help identify them. ELMC will supply the item as specified unless it can identify a quicker source and the MDA accepts the change of product.

Insight 5-7: It may be necessary to order long-lead items before the decision at DP 2. A specific Financial Approval for those items only may be given early.

- c. **Speed of supply.** ELMC can advise on how readily they can supply to the Required Delivery Date. Alternative sources may be identified. These may require a re-design.
- d. **Transportation.** Late orders, with a high priority placed on the demand, may be flown at PJHQ and DSCOM's discretion. This entails

considerable expense and operational cost. If the need was identified at the earliest opportunity, and clearly every effort had been made to get the items there some other way, PJHQ and DSCOM will look more favourably on a request to fly stores.

Insight 5-8: If items are to come from the UK, place the demand as early as possible *after* DP 2 (Financial Approval) to avoid unnecessary transportation costs.

Insight 5-9: Because Financial Approval is not needed to demand *codified* items, a unit, tempted to reduce the time to obtain resources, *could* demand stores *before* DP 2 (Financial Approval). However, this is not good practice as this prejudices the decision on whether the project will go ahead. It is far better for the Project Manager to make the case for an early demand of stores and obtain formal agreement to do so from the person who will make the decision at DP 2.

505. **Paying for codified consumables.** Codified items are owned by a Project Team within DE&S; this is Expeditionary Campaign Infrastructure (ECI) Project Team or Battlefield Utilities (BFU) Project Team in the case of most construction stores. The Project Team will have already paid a supplier for the stock using Spend on Stock Purchase (SOSP), see below. This allows the Project Team to work out the 'basic price' of each item and enter it on the Log IS. If the items are then demanded for a project in support of an Operation, the demand should be annotated with a Special Operations Code (SOC).⁶ This automatically ensures that when the items are issued to a project, the Top Level Budget (TLB) is charged the *basic price* for the item. On a periodic basis, the TLB then sums the cost of *all* issued codified items and uses the Net Additional Cost of Military Operations⁷ process to recoup the cost. The cost of items issued to a project is therefore aggregated with that of all other codified items issued over that period.

⁶ The SOC is often referred to as a '*** 3' code.

⁷ See Part 4 of JTTP 4-05.

Insight 5-10: Only the in-theatre construction unit holds a consolidated record of the cost of codified materials used on a project.

506. Spend on Stock Purchase. Spend on Stock Purchase (SOSP) is not a budget; it is a process for obtaining funds. The Project Team spends money through SOSP when the total stock holdings for a particular item fall below a pre-set level as monitored by the Log IS. Although the TLB was charged the previously established *basic price* for an item, the Project Team will have to pay the current market rate for its replacement. The replacement cost, and thus the true cost of the project, is therefore only known some time after the item was 'paid for' by the TLB.

Insight 5-11: Not only is the strategic transport cost impossible to determine for a codified item, so too is its replacement cost. This makes it impossible to establish the true cost to the MOD of codified items at the time when the project business case is being drawn up.

507. The system's preference for codified items. Where a codified item exists, the demand process requires that this item be used in preference over an equivalent non-codified item. This can mean having to wait for stores to arrive from the UK. However, if the demand cannot be met within the Required Delivery Date, but can be by purchasing it locally, the Project Team may authorise Low Value Purchase (LVP) (see below) in theatre. The Project Team should pay for this purchase using SOSP. However, as explained above, this hides the true cost of a project. Therefore it is more financially transparent to use the project budget authorised in theatre, to pay for these items.

Insight 5-12: If a codified item cannot be supplied by the Required Delivery Date, but can be by purchasing it locally, DE&S would normally pay for its Low Value Purchase in theatre. However, this obscures the true cost of a project therefore it is more transparent to use the project budget authorised in theatre to pay for this.

508. **Obtaining consumables from civilian suppliers.** There are two ways in which consumable project material may be obtained from a civilian supplier.

- a. **Enabling contracts.** Enabling contracts are set up either in the UK or in theatre. Under the contract, a supplier will agree to supply an item at an agreed cost. This saves time running a commercial competition each time. It also secures a better unit price. However, this agreement is based on a forecast of likely demand and will also have a maximum limit of total expenditure.

Insight 5-13: If items are obtained through an enabling contract, an unusually large demand for these items may breach the limit of expenditure of that contract. This may result in a delay in supply whilst the contract is either renegotiated or re-let. Early warning will avoid this.

- b. **One-off supply.** Any appropriately authorised commercial officer may arrange for a one-off supply of items.

509. **Low Value Purchase.** Low Value Purchase is the general term for the procurement of goods or services below the limit set for the Small Claims Court (around £5k) to cover the one-off procurement of goods and/or services which cannot be obtained from any other source. JSP 332 'Low Value Purchasing Manual' sets out the rules governing Low Value Purchase. The Low Value Purchase Officer plays a vital role in any project.

510. **Incorporating equipment and consumable stock into a project.** At the end of a project, consumable items are removed from the account through an 'incorporation certificate', signed by the Military Construction Force. Any unused consumable items should be returned to stock as they were only obtained against an authority for that specific project. However, it may be operationally prudent to retain a small number of items if it helps start the next project early and reduce its overall cost.⁸ Items of equipment are not normally corporate in this way. They are taken onto account by the unit responsible for the facility. At the end of the life of the facility they should be

⁸ A sensible balance is needed.

returned or disposed of in accordance with the guidelines set out in Chapter 4 of JTTP 4-05.

Insight 5-14: If items of equipment are *embodied* into the final construction, they must be taken onto the account of a unit that will remain responsible for them. It can sometimes be difficult to identify an appropriate unit, therefore this should be resolved during design.

Chapter 6 – Cost control

601. **Cost.** In practice, on the operational estate, it is never the case that projects are undertaken without *any* regard to their financial cost; nor, however, are essential, but expensive, projects forgone. The operational value of a project must always be balanced against its financial cost. When underway the costs of a project must always be managed to ensure Value for Money (VfM).

602. **Value engineering.** Value engineering is a technique used to help ensure that the best value for money is obtained from the project by seeking to gain the maximum utility from minimum resources. It is a process of systematically examining the proposed solution for each element of the requirement in order to identify if there is a cheaper method of achieving the same effect, particularly when considering the long-term maintenance of the facility. Value is maximised by removing, reworking or reducing the cost of those elements of the solution failing to deliver good value in respect of the requirement. The technique is best carried out as *brainstorming* with several people. It is most productive during the assessment stage when alternative concept designs and construction methods are being considered. It can also be very powerful if conducted collaboratively with the contractor/Military Construction Force. Simple examples of value engineering are:

- a. Air conditioning will effectively meet the requirement for a cool building. However, the requirement may be met more cheaply using a well-insulated, light-coloured structure with natural ventilation.
- b. Single-man accommodation rooms can be provided in a single storey block. However, the foundations and the roof provide poor value in this solution. A two-storey block can equally meet the requirement but reworking the size of the foundation and roof elements of the solution provides better value.
- c. The single-man rooms described above will provide poor value for money if delivered cheaply but repeatedly over a 30-year period when compared to a more robust but expensive structure, which will meet the requirement fully.

d. The capital cost of a concrete aircraft operating surface will be considerably more than that of an aggregate facility. However, if required for many years the former is likely to provide much better value through a significantly reduced maintenance burden.

603. **Project budget.** As explained in Chapter 12 of JTTP 4-05, Financial Approval is given to cover the estimated cost of a project plus any allowance for project risk; this is known as the Limit-of-Liability (LoL). The limit-of-liability is the project budget; costs must not be allowed to exceed this limit.

604. **Responsibility for monitoring costs.** The Project Sponsor¹ is the person to whom Financial Approval is given² for the project, therefore they are responsible for ensuring that the project stays within budget. This requires that project costs are monitored and reported upon. The Project Sponsor is free to arrange for someone to undertake this monitoring work:

a. **Project/Contract Manager.** The Project/Contract Manager is the natural choice for this task.

b. **Infrastructure Staff or J8 Accountant.** Alternatively, the Infrastructure Staff or J8 accountant may monitor project costs. However, they are only able to monitor invoiced expenditure and must rely on the Project Manager for a full cost-forecast.

605. **Cost progression.** As a project progresses, costs build up. It is essential to ensure that the cumulative current cost never exceeds the limit-of-liability. This is done by calculating the forecast out-turn cost, comparing it to the limit-of-liability, and using it to prompt a request for an uplift of funds. Figure 6.1 shows a simple graphical example of how project cost progression may be monitored.

a. **Cumulative current cost.** This is the total cost to date of the project. It is made up of:

(1) **Actual cost.** The costs incurred that have been paid.

¹ Usually the Infrastructure Staff.

² Whether by exercising their own Financial Authorisation or by receiving Financial Approval from someone else.

(2) **Accrual cost.** The value of works done or goods supplied for which payment is due but not yet made.

(3) **Committed cost.** The value of works and goods that have been ordered and for which there is a financial commitment to pay.

b. **Estimate to complete.** This is the estimate of the expenditure required to complete the project.

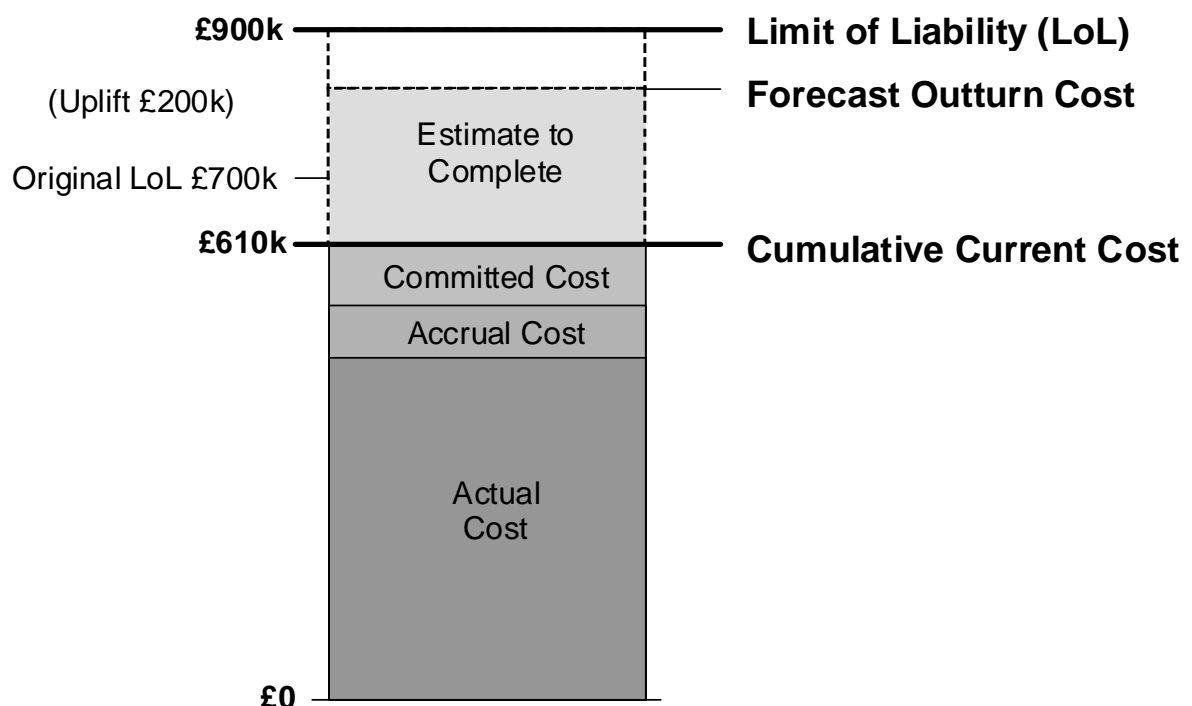


Figure 6.1 – Simple project cost progression

606. **Earned Value Management.** For most simple projects on the operational estate a simple cost progression chart will give adequate project cost information for the Project Sponsor. However, on larger projects, it may be more appropriate to integrate project cost and progress to get a better understanding of overall project performance. Earned Value Management is the measurement of project progress in terms of cost, time and technical/practical achievement against a defined scope of work.

607. **Methods of cost control.** Project costs can be controlled a number of ways:

- a. **Control of requests for change.** Changes to the requirement is a significant contributor to cost growth, particularly after the detailed design is complete. The single most potent way to control cost growth is to limit variations to the initial requirement.
- b. **Supply chain.** Cost can be controlled by finding cheaper suppliers and by the better control of resources.
- c. **Potential savings.** At intervals, time should be spent on identifying potential areas for savings. Value engineering is a useful tool in this respect.
- d. **Trade-offs.** Consideration should also be given to trading success criteria in another area (mainly quality) to reduce costs. However, before this is done, the impact on the criteria it is proposed to trade should be considered carefully.

Chapter 7 – Quality control

701. **Quality management.** Quality management is the discipline that is applied to ensure that the project's end product and the processes by which it is delivered meet the agreed requirement. Quality is therefore about fitness for purpose, and is achieved through a combination of quality assurance and quality control.

- a. **Quality Assurance.** The term Quality Assurance (QA) refers to the procedures and processes that provide confidence that the quality requirements will be met. Quality Assurance validates the consistent use of standards and procedures; it includes such things as quality audits, reviews, and the supplier's material certification.
- b. **Quality Control.** Quality Control (QC) on the other hand refers to the processes and mechanisms used to check that the specified quality has been achieved.

702. **Quality management standards.** The ISO 9000:2000 suite of standards provides an excellent guide to the management of quality. Accreditation to, or an understanding of the principles of, ISO 9000 is an indication that a contractor has an appropriate procedure to deliver a product to the agreed quality standard; however, it is not a guarantee.

703. **Configuration management.** Configuration management is the process by which information is managed and documents controlled to ensure that they remain up-to-date with any changes to the quality or design of the end product. Often referred to as *version control* it is the link between quality and change control. Appropriate use of document and drawing revision numbers, and a rigorously enforced filing/retrieval system are at the heart of the process. Configuration management tracks who has which documents and ensures that the latest versions are used by all.

704. **Authority Approvals.** As explained in Chapter 2 of JTTP 4-05, some Authority Subject Matter Experts are required to give their formal approval prior to occupation and use of a facility, such as the Fire Officer or the Senior Ammunition Technical Officer. This approvals process helps ensure that the

facility will be fit for purpose. Approvals should be tracked and formally recorded. Examples of Approval Authorities are:

- Host Nation (HN) representatives or others who control/coordinate infrastructure at the site
- Security/Force Protection Officer
- Fire Officer
- Fuel Design Authority
- Senior Ammunition Technical Officer
- Senior Air Traffic Control Officer
- Medical Staff
- Communications Staff
- Catering Officer
- Authorising Engineer/Theatre Safety Supervisor
- Environmental Health officer

705. **Design review.** The design review takes place during the assessment stage. It is an essential step in ensuring that the user's requirements will be met. The design review has a significant effect on the final project outcome. The decisions made at the review steer the future development of the project, and it is important that they have the agreement of the key stakeholders.

706. **Inspection and test plan.** The Military Construction Force/contractor should produce an inspection and test plan that is coordinated with the detailed delivery schedule. The plan should set out the quality checks, tests and inspections required in the implementation stage of the project. It should describe when each test is to be done and standard to be achieved. The plan should include the inspection and testing of:

- a. **Quality of materiel.** Ideally materiel should be inspected at the supplier's site. Alternatively, it can be checked on arrival before

acceptance. Other material, such as site-mixed concrete, should be tested directly before use.

b. **Quality of work.** The plan should identify specific points at which the quality of work should be checked. Suitable points might include excavations before backfill, reinforcement before pouring concrete, or dry testing of an electrical installation before energising.

c. **Commissioning.** The plan should identify the commissioning tests required and when they should take place.

d. **Equipment calibration.** Regular checking/calibration of test and measuring equipment.

e. **Site survey datum.** Protection and regular checking of site survey datum points.

707. **Role of the Military Design Authority Site Representative.** The Military Design Authority (MDA) Site Representative has an important role in helping to ensure quality. They should:

- Ensure implementation is in accordance with the approved drawings and specification.
- Witness quality checks set out in the Inspection and Test Plan, and all commissioning tests.
- Monitor the standard of materials and work.

708. **Quality records.** Records should be kept of the date, results and person carrying out all quality checks and testing. Where corrective action is required, this should also be recorded.

709. **Audit.** An audit is a useful way of confirming that appropriate processes, appropriate records, appropriate quality procedures, and appropriate corrective actions have been taken. Audits can usefully generate recommendations for improvement and capture best practice.

- a. **Internal audit.** Internal audit is carried out by a member of the project team or someone from the same unit.
- b. **External audit.** External audit is carried out by an independent party. For large projects, the CAA&I¹ may provide an external audit team.

710. **Feedback.** An important element of any quality system is feedback to achieve *continuous improvement*. Lessons identified and best practice, particularly in respect of improving the quality system for future projects, should be fed back through the chain of command.

711. **Project control.** Problems with poor quality can be corrected by:

- a. **Communication.** Clear communication to all relevant parties of the minimum standards is essential. This must be supported effectively by insisting on the reworking/replacement of elements of sub-standard work.
- b. **Test and Inspection Plan.** The Test and Inspection Plan can be applied more rigorously and/or revised.
- c. **Trade-offs.** Consideration should also be given to trading time and/or cost to improve quality. However, before this is done, the impact should be considered carefully.

¹ See JTTP 4-05.

Chapter 8 – Change control

801. **Controlling change.** *Change control* is the process that ensures that all changes to the original project parameters are identified, evaluated and then either rejected, or approved and implemented. Inevitably some changes will be required during the project and should be expected. However, if left uncontrolled the scope of the project can quickly grow. Small changes may not seem to have much impact, but they can quickly compound and threaten the project's success. Changes should be difficult to make in order to deter the unnecessary, yet still possible, changes which could disadvantage the project. Properly managed, changes should be integrated through the project's configuration management process.

802. **Sources of change.** Typically the two main sources of change are:

- a. Changes to the requirement driven by the User. The Infrastructure Staff should resist these changes once the User Requirement Document (URD) is agreed, but they are occasionally unavoidable.
- b. Changes to design detail are often suggested by the contractor/Military Construction Force (MCF) in order to correct errors or to simplify construction.

803. **Changes to requirement.** This is covered in detail in Chapter 2 of JTTP 4-05.

804. **Requests for change.** The contractor or MCF may make a Request for Change (RFC). Other than for small-scale adjustments, any proposed changes to design should be made through a formal request for change. This is processed through the Project Manager to the Military Design Authority (MDA) Site Representative. When considering an request for change, the effect on the project's agreed time, cost and quality must be assessed.

805. **Variation Order.** A Variation Order (VO) is a formal instruction for an alteration to the design or schedule, which may result in financial, time or quality penalties. They should be uniquely numbered, tracked and recorded.

- a. **Source.** A VO may result from a request for change or a change of requirement endorsed by the Infrastructure Staff.
- b. **Consequences.** The consequences of a VO in terms of time, cost and quality *must* be carefully considered *before* approval.
- c. **Approval.** VOs must be approved by both the designer and Project Manager. Depending on the value, importance, or sensitivity of the project, the Project Sponsor *may* also insist on approving some VOs. If the cost of a VO will push the forecast of out-turn above the limit-of-liability, then the Project Sponsor's approval *must* be sought as he will need to balance the merits of approving the VO with the need to get an uplift to the budget. The Project Sponsor's role in approving VOs should be agreed at the outset. *A light touch* is required, otherwise the approvals process will become cumbersome and time consuming, and will undermine the Project Manager's authority.

806. **Military Design Authority Site Representative.** The MDA Site Representative may also be known as the Design Control Officer (DCO) or the (Site) Supervising Officer (SO). The MDA Site Representative is empowered to represent the design team during the preparation, implementation and closure stages of the project. As such, he should be familiar with the design, the history and the reasons behind its development. The MDA Site Representative works independently of the Project Manager and must have a good collaborative working relationship with him. The MDA Site Representative is responsible for:

- Ensuring that the Contractor/MCF follows the approved drawings and specification(s).
- Agreeing routine, on-site design detailing.
- Processing Request for Change.
- Issuing Variation Orders as required.

Chapter 9 – Safety, Health, Environment and Fire risk

901. **Safety, Health, Environment and Fire risk on infrastructure projects.** The Safety, Health, Environment and Fire (SHEF) risks on an infrastructure project on operations are the same as, or greater than, those faced on similar projects in the UK. Alongside these risks are the operational risks posed by the actions of an adversary (injury or death from rocket attack or small arms fire, for example). Both risks must be managed together. This is explained in detail in Part 3 of JTTP 4-05. Theatre Standard Operating Procedures (SOPs) describe the way in which the infrastructure support safety is managed on the operational estate¹ in that specific Military Works Area.

902. **Safety legislation and policy.** The Project Manager must have a good working knowledge of the appropriate relevant legislation and MOD policy applicable to the project. The Construction (Design and Management) Regulations (CDM) 2007 have a significant impact on the way in which infrastructure projects are managed and safety is coordinated. Chapter 11 of JTTP 4-05 explains in outline how the CDM Regulations are generally applied to the operational estate.

a. **Appointments and roles.** The advice of the Joint Force Engineer should be sought on the most appropriate appointments under CDM. As a guide:

- (1) **Client.** The Project Sponsor (Infrastructure Staff). See Chapter 11 of JTTP 4-05 for details.
- (2) **CDM Coordinator.** The Works Group HQ if one is present.
- (3) **Designer.** The Military Design Authority, usually an Specialist Team Royal Engineers.
- (4) **Principal contractor.** Contractor/Military Construction Force.

¹ Including, for example, any Safe System of Work, inspections to mitigate risk.

b. **Notification criteria.** Construction work may be classified as 'notifiable' for a number of reasons²:

- (1) More than 30 days on site.
- (2) More than 500 person-site days.
- (3) Potentially high-risk activities of whatever duration. These include demolition, deep excavations, work with, or close to, high voltage power, underwater construction or where there is a risk of falling into fast-moving water, work in highly contaminated ground, work utilising explosives, or unusual methods of work, especially complex lifting tasks.

903. **CDM Coordinator.** The CDM Coordinator is responsible for coordinating the work of all stakeholders in respect of health and safety arrangements in order to ensure that they comply with their responsibilities. See Annex 1B for details during each project stage. The CDM Coordinator's key roles are to:

- Provide continuity in health and safety issues throughout the project.
- Ensure good communication between main stakeholders.
- Advise the Client on their duties under the CDM Regulations 2007.
- When appropriate, notify the appropriate authorities of the planned work.
- Approve the construction SHEF Plan before work starts.
- Ensure that a H&S File is produced and handed over to the Client at the end.

904. **Initial Health and Safety Plan.** During the project definition stage, the Military Design Authority will make an initial assessment of SHEF issues. These must be recorded and transferred to those responsible for the detailed design in the assessment stage; usually an STRE. During the detailed design development, the STRE will produce a Initial Health and Safety Plan

² The significance of being notifiable is explained in Chapter 12 of JTTP 4-05.

(IHSP) that lists the SHEF hazards they have identified, what actions they have taken to mitigate them (as designers), and what residual risks remain for the construction force to protect against. This IHSP is handed over to the contractor/Military Construction Force.

905. **Construction Safety Plan.** The contractor/Military Construction Force will produce a detailed Construction Safety Plan during their project preparation.³ The Construction Safety Plan will incorporate the designer's IHSP but add the detailed method statements and site management details that can best be developed by the contractor/Military Construction Force. The Construction Safety Plan must be approved by the CDM Coordinator.

³ A Military Construction Force will do this as part of their Detailed Engineer Plan (DEP).

Annex A – Project management insights

Chapter 1 insights

A1. This Annex consolidates the insights drawn throughout this document.

A2. **Insight 1-1 –Project management.** Project management is simply about the efficient execution of a discrete package of work in order to ensure it is delivered as agreed.

A3. **Insight 1-2 – Keep it simple but effective.** Do not over-complicate the project management process. Laconic effectiveness *negates* volume of paperwork.

A4. **Insight 1-3 – Be clear about responsibilities.** When drawing up a project management structure make sure that it is clear who is responsible to whom and for what; and that a Project Manager is responsible for the handover of the project.

A5. **Insight 1-4 – The need for a Project Sponsor.** There must be a Project Sponsor who is empowered to make decisions.

A6. **Insight 1-5 – Design is iterative.** Design is an iterative progression. As a rule-of-thumb:

5-15% Design Concept (for stakeholder approval).

20-40% Indicative Design (for ITT as design and build).

60-90% Detailed Design (to start construction or ITT).

Chapter 2 insights

A7. **Insight 2-1 – Manage projects as it flows through the stages.** The flow of the project should be managed through its stages rather than the activities they contain. Enforce the discipline of timely and unambiguous decision making at the decision points.

A8. **Insight 2-2 – Check the proposed solution with the User.** Always check with the User that the proposed solution will indeed meet his needs.

Chapter 3 insights

A9. **Insight 3-1 – Focus on project risk.** Do not confuse risks to the project (project risk) with risks to life and limb (SHEF risk).

A10. **Insight 3-2 – Risk Assessment is subjective.** Be cautious of any risk assessment that is quoted with a high degree of accuracy or ‘confidence level’.

A11. **Insight 3-3 – Project from the Project Sponsor’s point of view.** The Project Manager must be sure to articulate risk from the point of view of the Project Sponsor.

Chapter 4 insights

A12. **Insight 4-1 – Gantt Charts are useful.** A Gantt chart can be extremely useful even for projects lasting just a few days and delivering battlefield, as opposed to campaign infrastructure. It helps tired minds to clarify the project schedule and allows detailed monitoring and reporting of progress. More importantly, it allows the early identification of problems that may lead to a delay in completion.

Chapter 5 insights

A13. **Insight 5-1 – Logistics – it just appears.** It is important to know where all the materiel comes from, how to pay for it and how to ensure it gets to where you need it. It is essential that the resourcing strategy for a project is sound.

A14. **Insight 5-2 – Cost of strategic transport.** The cost of strategic transport of materiel through the coupling bridge for a specific project may be high, however, it is impossible to determine. This must be borne in mind when preparing a business case as it may make it impossible to compare costs of different courses of action on an equitable basis. Nor can the true cost of a project be determined.

- A15. **Insight 5-3 – Establishing an accurate cost.** By using locally procured consumables, a more accurate resource cost can be established. This may be significant if the work is undertaken on a repayment basis.
- A16. **Insight 5-4 – Theatre controls priority of movement.** Because theatre maintains the priority list for the supply of items into theatre, it is prudent to ensure that the Theatre Movements Staff are aware of the urgency of specific project supplies.
- A17. **Insight 5-5 – Entrusted stock belongs to the MOD.** Because consignments of entrusted stock are often marked for delivery to a contractor, individuals in the Joint Supply Chain often mistakenly assume that they *belong* to the Contractor. This has led in the past to important supplies being removed from consignments to *make way for military supplies*. Periodic re-education is often required.
- A18. **Insight 5-6 – Paying for codified items.** Regardless of on whose behalf the infrastructure is provided, or how the overall project is being funded, the Top Level Budget of the construction unit that *consumed the stock* is charged the cost of codified consumable items.
- A19. **Insight 5-7 – Early Financial Authority for long-lead items.** It may be necessary to order long-lead items before the decision at DP 2. A specific Financial Approval for those items only, may be given early.
- A20. **Insight 5-8 – Place demands as quickly as possible.** If items are to come from the UK, place the demand as early as possible *after* DP 2 (Financial Approval) to avoid unnecessary transportation costs.
- A21. **Insight 5-9 – Do not demand stores before approval is given to proceed.** Because Financial Approval is not needed to demand *codified* items, a unit, tempted to reduce the time to obtain resources *could* demand stores *before* DP 2 (Financial Approval). However, this is not good practice as this prejudices the decision on whether the project will go ahead. It is far better for the Project Manager to make the case for an early demand of stores and obtain formal agreement to do so from the person who will make the decision at DP 2.

A22. Insight 5-10 – The Importance of the in-theatre resources

account. Only the in-theatre construction unit holds a consolidated record of the cost of codified materials used on a project.

A23. Insight 5-11 – It is impossible to determine the true cost of

codified items. Not only is the strategic transport cost impossible to determine for a codified item, so too is its replacement cost. This makes it impossible to establish the true cost to the MOD of codified items at the time when the project business case is being drawn up.

A24. Insight 5-12 – Paying for local purchase.

If a codified item cannot be supplied by the Required Delivery Date, but can be by purchasing it locally, DE&S would normally pay for its Low Value Purchase in theatre. However, this obscures the true cost of a project, therefore it is more transparent to use the project budget authorised in theatre, to pay for this.

A25. Insight 5-13 – Avoiding delays with enabling contracts.

If items are obtained through an enabling contract, an unusually large demand for these items may breach the limit of expenditure of that contract. This may result in a delay in supply whilst the contract is either renegotiated or re-let. Early warning will avoid this.

A26. Insight 5-14 – Handing over equipment at the end of a project.

If items of equipment are *embodied* into the final construction, they must be taken onto account of a unit that will remain responsible for them. It can sometimes be difficult to identify an appropriate unit; therefore this should be resolved during design.

Lexicon

Part 1 – Glossary of terms

accrual cost

The value of works done or goods supplied for which payment is due but not yet made.

actual cost

The costs incurred that have been paid.

approval authorities

The Subject Matter Experts whose formal endorsement must be obtained prior to occupation/use of a facility.

change control

The process that ensures that all changes to the original project parameters are identified, evaluated, and then either rejected, or approved and implemented.

codification

The process by which a unique designation is assigned to a type of item in order to allow it to be entered into, and managed by, a Log IS.

committed cost

The value of works and goods that have been ordered and for which there is a financial commitment to pay.

configuration management

The process by which information is managed and documents controlled to ensure that they remain up-to-date with any changes to the quality or design of the end product.

contract management

The through life cycle control of the contract by which the work is completed.

contract sponsor

The person who commissions a contract.

critical path analysis

The process of examining activities within a project to determine which, if delayed, will cause a delay to the overall project.

cumulative current cost

The total cost to date of the project.

decision point

The formal decision at the end of a project stage on whether to stop the project, invest more resources and continue to the next phase, or re-examine the project.

design review

A formal re-examination of the proposed work within a project. It serves to confirm that the work will meet the User's needs.

detailed engineer plan

A comprehensive plan for the construction work.

earned value management

The measurement of project progress in terms of cost, time and technical/practical achievement against a defined scope of work.

enabling contract

A standing commercial arrangement for the supply of goods and services.

estimate to complete

This is the estimate of the expenditure required to complete the project.

government furnished equipment

Material supplied to a contractor by the MOD to enable them to exercise the contract.

health and safety file

The document approved by the CDM Coordinator and passed to (from the constructor) the maintainer.

long-lead items

Stores or other materiel that take a particularly long time to procure.

low value purchase

The procurement of goods or services below a set financial limit.

military construction force

The military body trained to provide infrastructure support.

military design authority

The military body with authority to establish design standards and assess compliance with those standards.

not in vocab(ulary)

Not codified in a way that is recognised by the Log IS.

operational infrastructure reconnaissance

An initial, outline examination of the project used to assess its viability and possible solutions.

outline engineer plan

An initial plan for the construction work.

programme management

The coordination, direction and oversight of the implementation of a set of related projects and activities in order to deliver outcomes and benefits related to an organisation's strategic objectives.

project management

The process of planning, organising, securing and managing resources to bring about the successful completion of specific project goals and objectives.

project management plan

A document that pulls together the various plans covering all aspects of the project, describing how it will be conducted, the resources needed, its organisation and any procedures to be followed.

project manager

The person who manages a project.

project risk

An uncertain event that, should it occur, would have a detrimental effect on the achievement of one or more project objectives, for example, delay or increased cost.

project success criteria

A set of clear objectives based on the needs of the user and against which the success of the project can be subsequently evaluated.

project sponsor

The person who commissions a project.

project stage

Discrete phases within the life cycle of a project.

purple gate

The point of entry for material into the Joint Support Chain.

snagging

Identifying and fixing problems on a newly constructed item of infrastructure.

stakeholders

The organisations and people who have an interest or role in the project, or who are impacted by it.

tactical infrastructure reconnaissance

A detailed examination of the project used to develop a solution.

task

A relatively simple, short duration activity best understood and performed by a specific person or organisation; a project usually consists of many tasks.

user

The person or organisation expected to operate from, or with, the infrastructure that is provided by the project.

value engineering

The systematic improvement of the 'value' of an item of infrastructure by examining its function.

variation order

A formal instruction for an alteration to the design or schedule, which may result in financial, time or quality penalties.

work breakdown structure

A logical, structured, hierarchical way in which project activities/work packages can be identified.

Part 2 – List of abbreviations

APM	Association of Project Management
CPA	Critical Path Analysis
CS	Contract Sponsor
DSCOM	Defence Support Chain Operations and Movements
EHO	Environmental Health Officer
ELMC	Engineer Logistics Management Cell
EOI	Expression of Interest
GFE	Government Furnished Equipment
IDP	Infrastructure Development Programme
ITC	Improved Tented Camp
ITT	Invitation to Tender
JSC	Joint Support Chain
LoL	Limit of Liability
MAOT	Mobile Air Operations Team
MCF	Military Construction Force
MDA	Military Design Authority
Pg Mgr	Programme Manager
PG	Purple Gate
PMP	Project Management Plan
RDD	Required Delivery Date
SATO	Senior Ammunition Technical Officer
SHEF	Safety, Health, Environment and Fire
SME	Subject Matter Expert
SOR	Statement of Requirement

Lexicon

TCQ	Time, Cost, Quality
TFO	Theatre Fire Officer
WBS	Work Breakdown Structure
WCO	Works Contract Officer