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PUBLIC SECTOR FACILITY MANAGEMENT AT MILITARY UNIT LEVEL: AN EXPLORATORY STUDY

By

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Abstract

The purpose of this research is to explore the scope and understanding of facility management (FM) in the public sector, and specifically at military unit level, and compare it with a normative model.

The principles of applied research are used in a single exploratory and instrumental case study with a mixed-method approach of data gathering. The literature review studied secondary data to create context, and open-ended and closed-ended questions in a questionnaire produced primary data on the actual scope and understanding of FM. A sequential mixed research approach was used to discuss the five research propositions.

The research found that FM policies do not extend to military unit level. Furthermore, that FM practitioners have some understanding and competencies but there is no consistency in and between units, and therefore, support is needed in some. Support is required in the form of training/education, career development, budgets and structures as identified by FM practitioners.

The Department of Defence (DOD) needs to define and communicate FM; structure FM down to military unit level; staff structures; train, educate, and promote FM practitioners as FM professionals; and fund FM activities. FM practitioners need to be informed and skilled, they should build networks, and be cost conscious.

This research is limited by studying FM at only a few military units on the West Coast of South Africa, which limits statistical inference and the establishment of FM within the whole of the DOD.

Although FM research has been done within the South African public sector, and the DOD has made contributions, no previous research has focussed on FM at military unit level. The value of this research is a consolidated and focussed effort towards FM, which ultimately contributes to state security and the cost thereof. Future research should find the optimal structure, staffing and competencies for FM in military units.

Dedication

To my Mother whose work ethic and commitment as a custodian of scarce resources has always been exemplary and remains inspirational.

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List of definitions

The following FM relevant definitions are listed in the User Asset Management Plan for 2015/2019 (Department of Defence, 2014 : p. 11):

Acquisition: For national government, acquisition means “to acquire” through construction, purchase, lease, acceptance of a gift, expropriation, exchange or transfer of custodianship between custodians in that sphere of government. For provincial government, acquisition means “to acquire” as defined in the relevant provincial land administration law or transfer of custodianship between custodians in that sphere of government.

Best value for money: The outcome of considering evaluation criteria that includes financial, non-financial (e.g. environmental, heritage and cultural benefits) and socio-economic benefits.

Building: A discreet building block, which may comprise one or more floors and which usually is of a uniform design, has a uniform set of elements and standard of detailing. A structure is a building when it has a roof and is at least 1.8m high.

Conservation, cultural and heritage assets: This includes, but is not limited to, monuments, historical sites, heritage sites, conservation areas and sites of scientific significance.

Custodian: A national or provincial department designated in terms of GIAMA that must plan, acquire, manage and dispose of immovable assets.

Determined life: The planned period between refurbishments in the immovable asset's life cycle.

Disposal: Any disposal contemplated in the State Land Disposal Act, Act No 48 of 1961, other relevant legislation or a provincial land administration law.

Facility: A facility would usually comprise a number of buildings on a specific site.

Immovable asset: Any immovable asset acquired or owned by government. Immovable assets are further described as land and any immovable improvements on that land, which have enduring value and consist of assets of a residential, a non-residential or an infrastructure nature, including machinery and equipment that have been installed and are an integral part of immovable assets. It includes all assets, both state-owned and leased.

Immovable asset management: Those management processes that ensure that the value of an immovable asset is optimised throughout its life cycle.

Infrastructure: This includes, but is not limited to, roads, harbours, railway lines, airports, transmission lines, dams and pipelines.

Land: This includes, but is not limited to, developed, undeveloped, vacant, cultivated, non-useable or inaccessible land.

Life cycle: The National Treasury prescribed period (per asset class) during which a custodian could expect to derive economic benefits from the control of an immovable asset.

Maintenance: All work on an existing immovable asset that is undertaken to prevent deterioration and failure, restore the immovable asset to its specified level of operation, restore the physical condition to specified standards, recover the immovable asset from structural and service failure, and replace (partially or with an equivalent) the components of the immovable asset.

Maintenance excludes improvements and upgrading to meet new service capacity or functions, refurbishment to a new condition to extend the capacity or useful life, replacement of major components to extend the capacity or useful life, upgrading to meet new statutory requirements, operational tasks to enable occupancy use (e.g. cleaning, security, waste removal), supply of utilities (energy, water and telecommunications), construction of new assets, and major restoration as a result of natural and other disasters.

Reconfiguration: The implementation of activities to make changes to the configuration of an immovable asset, thereby changing the functionality of the asset. An example of reconfiguration is to make changes to the internal walls of a building to develop open-plan offices. Reconfiguration cannot be classified as maintenance as it comprises changes requested by a user to increase the functionality of the asset to contribute to the achievement of service delivery objectives. A user therefore initiates reconfiguration, whereas a custodian initiates maintenance, renovation or refurbishment.

Renovation: Comprehensive capital works actions intended to bring an immovable asset back to its original appearance. Renovation works do not necessarily extend the functionality or the life of the asset, but are necessary for the planned life to be achieved. In such cases, the capital value of the asset is not affected.

Refurbishment: Comprehensive capital works actions intended to bring an immovable asset back to its original appearance or state or to extend its life cycle. It may also be required for

historical preservation. Refurbishment generally takes place at the end of an asset's life cycle to extend the life cycle and gain further income potential from the asset.

Repair: Actions required reinstating an immovable asset to its original state when such an asset is damaged accidentally or maliciously.

Site: A single stand or contiguous set of plots or stands from which a specific service is provided. Adjoining sites not sharing a common boundary but which form part of the complex are given separate facility numbers

Strategic plan: The strategic plan of a custodian or user as prescribed in terms of the Public Service Act and the PFMA.

Surplus: In relation to an immovable asset, that the immovable asset no longer supports the service delivery objectives of a user.

Useful life: The period during which a user derives benefit from the use of an immovable asset.

User: A national or provincial department that uses or intends to use an immovable asset in support of its service delivery objectives (and includes a custodian in relation to an immovable asset that it uses or intends to use in support of its own service delivery objectives) (Department of Defence, 2014 : p. 11).

List of acronyms and abbreviations

AFB	Air Force Base
BIM	Building Information Modelling
CAFM	Computer Aided FM
CJOPS	Chief of Joint Operations
CMMS	Computerised Maintenance Management Systems
CPPP	Computerised Project Planning and Programming
CSANDF	Chief of the South African National Defence Force
DEP	Defence Endowment Property
DFac	Directorate Facilities
DI	Defence Intelligence
DOD	Department of Defence
DODI	Department of Defence Instruction
DoRA	Division of Revenue Act
DWC	Defence Work Capability
DWF	Defence Works Formation
EM	Environmental Management
FM	Facility Management
FRS	Facility Register System
FSE	Force Structure Elements
GIAMA	Government Immovable Asset Management Act
IAM	Immovable Asset Management
IAR	Immovable Asset Register
ILC	Infrastructure Life Cycle Management
IMS	Information Management Systems
LCC	Life Cycle Costing
LGA	Local Government Authority
MCC	Military Command Council
MTEF	Medium Term Expenditure Framework
NDPW	National Department of Public Works
NEMA	National Environmental Management Act
OHSA	Occupational Health and Safety Act
PFMA	Public Finance Management Act
PMTE	Property Management Trading Entity
SAAF	South African Air Force
SAMHS	South African Military Health Service
SANDF	South African National Defence Force
SANS	South African National Standard
SAS	South African Ship
SecDef	Secretary of Defence
SFR	Special Forces Regiment
SLA	Service Level Agreements
SWP	Standard Working Procedure
UAMP	User Asset Management Plan

CHAPTER 1: INTRODUCTION

1.1 Introduction

The Department of Defence (DOD) has to defend and protect the Republic, its territorial integrity and its people and in order to do so it needs personnel, funds, equipment, and facilities (Department of Defence, 2001). Facilities in the shape of land and buildings, are material resources (national assets), that are entrusted for military use to prepare and provide forces. As such, it should be managed effectively. Effective management implies a full life cycle approach consisting of acquisition, utilisation, and eventually disposal (Department of Defence, 2001). Government property, excluding special cases, falls within the custodianship of the National Department of Public Works (NDPW). This custodianship is a significant task and the following three issues have become apparent.

The annual Public Works Report for 2000 indicated that the South African government property portfolio numbered more than 120 000 properties. During the same year the Minister of Public Works was quoted to indicate that the South African Government had the largest property portfolio in the southern hemisphere numbering 243 000 properties to the value of R120 billion, at a running cost of R4 billion per year (Buys and Tonono, 2007). This difference in property assessment poses the first issue of concern, which is the lack of a proper and correct asset register.

In the Public Works Annual report for 2014/15 Nxesi indicated that an Immovable Asset Register (IAR) has been created, that buildings have been physically verified, and that fair values have been assigned to 66% of assets resulting in a disclosed municipal value of R78.1 billion compared to a value of R49 million [sic] in 2012/13. Nxesi stated: "…when the Register is finalized and will reflect in the national balance sheet more appropriately" (Department of Public Works, 2015 : p. 14). Hence, to date the register is not finalised.

Buys and Tonono in their research noted, that according to Bici's research in 2006, an alleged maintenance backlog of R13 billion existed which raises the second issue of concern: the NDPW is not able to maintain government property (Buys and Tonono, 2007). Buys and Mavasa (2007) confirmed this assessment in stating that the National Department of Public Works (NDPW) is "currently ineffective in asset life cycle management, there is no clarity on the existence of an immovable asset management (IAM) plan and that there is an urgent need for competent personnel with adequate skills to verify, capture and correct property data in an effective asset register" (Buys and Mavasa, 2007 : p. 1).

A third issue of concern is raised in the NDPW annual report of 2014/15 when reference is made to irregular spending of more than R35 billion (Main Account and PMTE combined). This irregular spending was with regard to 394 820 transactions between 2009 and 2014 (Department of Public Works, 2015).

During a 2015 briefing on Property Management Trading Entity (PMTE) and Lease Portfolio to Parliament Govender indicated that there are a minimum of 32 000 registered and unregistered land parcels, with 108 000 structures on them. Govender also listed that 112 properties of the 2 162 leases from the private sector was vacant. Of the 112 properties 29 properties were occupied by non-DPW clients. Of the 2 162 leases 578 had no lease agreements, and 1 176 backlog leases had been identified. As a result, Filtane (UDM) illustrated his infuriation in saying that "the state of affairs in the Department, calling it depressing". Filtane also complained: "that the state property management portfolio was underutilised and neglected"... "This indicated that the problem still persisted, despite the turnaround in place. He wondered whether the turnaround was actually having any effect on the Department" (Parliamentary Monitoring Group, 2015).

Kohler Barnard of the DA in a speech in April 2016 indicated that the PMTE has lost 1 200 properties, which cannot be found. Barnard also questioned the quality of the data of the PMTE having found Midvaal Erf 43 Portion 0 of Pendale Agricultural Holdings to be in the middle of the North Atlantic (Kohler Barnard, 2016).

These issues are relevant to the DOD because it influences its ability to reach its objectives. In the DOD annual report of 2015/2016 it was reported that the maintenance backlog is increasing due to the low expenditure on planned maintenance by NDPW. In 2015/16 the DOD spent R478.6m on refurbishments which was equal to 57% of the annual target. In the same period only R245.1m (26.8%) of the R914.3m that was handed over to NDPW, was spent on planned maintenance. As a result the NDPW experienced a backlog of R6.8 billion which necessitated the inclusion of a clause in the Service Level Agreement (SLA) between the DOD and NDPW to change the trend (Department of Defence, 2016). However, the DOD knew at an earlier stage that the NDPW is not the only party to blame when it comes to service delivery.

The Department of Defence Instruction (DODI): Policy and Planning 00033/2000 identified that the DOD struggled to manage: "service delivery in a significantly cost effective manner", and, "struggled to become results orientated in administration and management processes"(Department of Defence, 2001 : p. 32). The aim of DODI Pol & Plan 00033/2000 was to: "improve efficiency, cost-effectiveness and economy in the delivery of service to the DOD" and as a result to address the then low returns on the high investment in assets(Department of Defence, 2001 : p. 33). The DOD admitted that the resources allocated to its supporting functions exceeds resource allocations to similar size organisations, and that the decentralised structure of control and execution was the cause of it (Department of Defence, 2001). On the other hand, can it be due to incompetence of DOD facility managers?

Buys and Tonono, in 2007, found that FM managers in the public sector are knowledgeable, that some are inexperienced, that information management systems are not used extensively, and that the poor condition of state property is not only due to inappropriate funding but also to a lack of properly trained FM managers (Buys and Tonono, 2007).

Hence, this research attempts to understand what FM practitioners in the DOD at the unit level know about the "state" of the DOD properties within their jurisdiction. In order to find these and more answers about the understanding and state of FM at military unit level this

research will identify general FM concepts, explore the FM context in the public sector, and question unit facility managers.

1.2 Background

Although the DOD FM context will be explored in greater detail in Chapter 3 it is prudent to provide a brief overview at the outset. Background to relevant legislation, role players, and the FM Strategy formulation process will be discussed first. Secondly, numbers will be provided on the size and cost of DOD facilities, and thirdly, the challenges experienced, and the initiatives implemented will be outlined.

FM in the SANDF historically focused on land, buildings and the environment and its application has escalated since the late 1970's. The SANDF realised the importance of good planning and orderly development in the Republic of South Africa and started to get involved in the State's spatial planning activities. At the same time, the importance of the environment was recognised and roles and responsibilities was developed and promulgated.

Being a department of the State, the DOD is controlled and regulated by the Government and as such have to adhere to its regulations and guidelines. Some of the laws and policies that should be considered are: the Public Finance Management Act (PFMA), no 1 of 1999, the Government Immovable Asset Management Act (GIAMA), Act 19 of 2007, the Defence Act, 42 of 2007, the Defence Endowment Property and Account Act, No 33 of 1922, and the South African National Heritage Act, No 25 of 1999. All of these acts are founded on the Constitution of the Republic of South Africa which, amongst other things, separated the ownership of state-owned immovable property.

Section 4 of GIAMA confirms the custodianship and responsibility of the Minister of Public Works and the NDPW. Custodianship that controls economic benefits or service potential, and not physical control. Furthermore, the NDPW is responsible to meet the requirements of occupiers; provide required accommodation to national departments; ensure optimal

utilisation of all properties; maintain and enhance value of property; and to contribute to Government's broad socio-political objectives.

The Defence Endowment Property and Account Act reserves some assets to the DOD. Land, buildings and interest in RSA which belonged to the UK (War Department) and was transferred to the Government of the Union in 1921 to hold, use and conserve exclusively for the benefit of Defence Force Organisations now belongs and falls under the custodianship of the DOD.

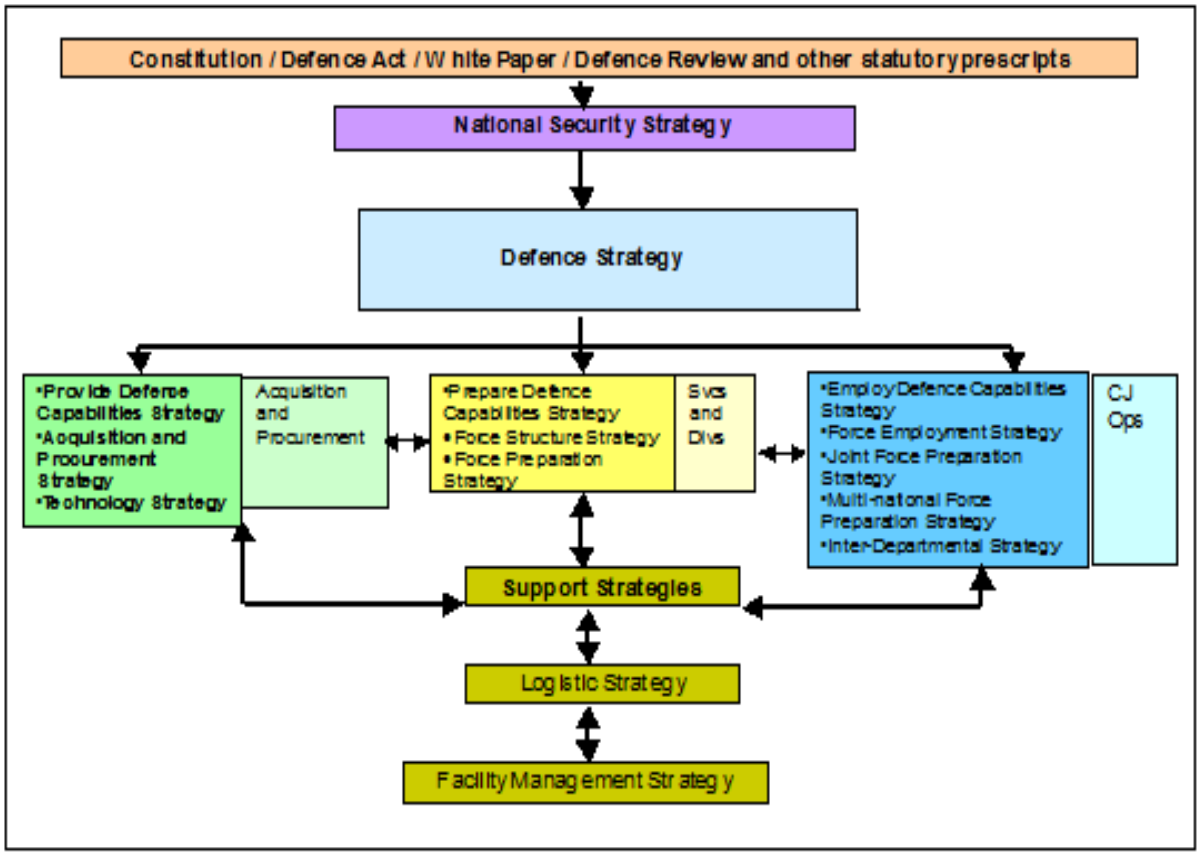

Figure 1: Hierarchy of Strategies (Source: Department of Defence, 2009)

The formulation of the FM Strategy of the DOD, as illustrated in Figure 1, is derived from the above-mentioned acts, white papers, defence reviews, and various other legislation. The process is as follows: Government guides the National Security Policy and Strategy; the DOD Defence Strategy provides the Secretary for Defence (Sec Def) and the Chief of the South African National Defence Force (CSANDF) with a basis to determine activities and required

resources; the Military Strategy then provides general guidelines for force provision and force employment by means of strategic objectives, strategic concepts, and strategic capabilities; the support strategies will be included in the Military Strategy; and included in the support strategies is the FM Strategy. Therefore, there is a link between objectives and FM decisions and day-to-day activities.

Structure should follow strategy and the DOD has a lot of structure. The DOD has a property portfolio of approximately 450 000 hectares which consist of the following categories: state-owned land that belongs to DPW (4 200 000 000m^2), state-owned buildings that belong to DPW (9 000 000m^2), endowment property that belongs to DOD (230 000 000m^2), and property leased from the private sector (500 000m^2) (Department of Defence, 2016).

The DOD has 2 538 facilities with a total site area of 3 410 904 716m^2, and 38 010 buildings with a total floor area of 8 678 400m^2 (Department of Defence, 2016). The average utilisation rate is 93% and the state of property in 2015/16 was: 1% good, 38% acceptable, 55% fair, 4% poor, and 2% very poor. The main reason for deterioration was mainly due to lack of maintenance (57%) as can be seen in Figure 2.

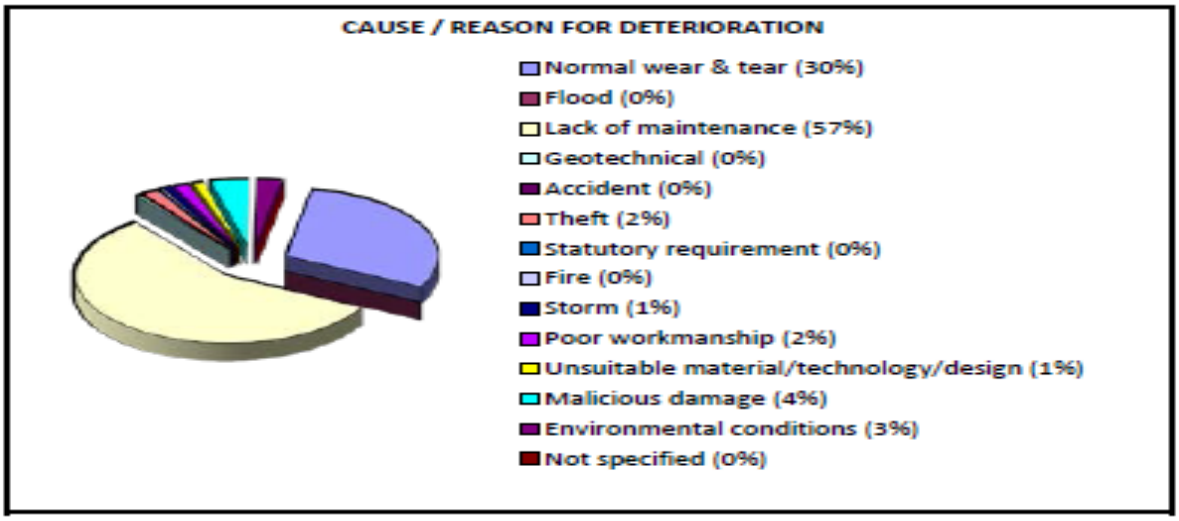

Figure 2: Cause/reasons for deterioration (Source: Department of Defence, 2016)

In 2014, the replacement value of the DOD portfolio was R73 161 811 942, and the total land value (excluding leased properties) R160 195 658 042 (Department of Defence, 2013; Department of Defence, 2014). In 2011 the estate management budget of the DOD was R1.8 billion per annum that was applied as follows: state-owned land that belongs to DPW (R1 100m), state-owned buildings that belong to DPW (R360m), endowment property that belongs to DOD (R120m), and property leased from the private sector (R175m) (Department of Defence, 2011).

In the 2015/16 financial year the following amounts were spent on existing facilities: R16.3m on upgrades and additions, R341.5m on rehabilitation, renovations and refurbishments, R155.2m on maintenance and repairs of which R67.6m was on day-to-day maintenance. The amount of R20.7m was spent on new and replacement assets, (Department of Defence, 2016). The DOD User Asset Management Plan (UAMP) budget for the period 2016-2019 is illustrated in Table 1.

Table 1: UAMP budget 2015-2018 (Source: Department of Defence, 2014)

Budget Type	UAMP Projection 2015/16	UAMP Projection 2016/17	UAMP Projection 2017/18	UAMP Projection 2018/19	Estimated total required for MTEF
Capital projects in Progress	333 060 789	152 960 632	4 107 124	4 517 836	906 565 051
Capital Projects in Planning	240 413 230	295 143 430	385 000 000	237 150 000	1 286 533 808
Total Capital	573 474 019	448 104 062	389 107 124	241 667 836	8 400 569 447
Refurbishment projects in Progress	1 097 493 885	1 347 760 307	801 895 086	882 084 594	4 870 194 230
Refurbishment Projects in Planning	203 855 179	277 328 348	172 382 782	183 700 960	919 819 736
Total capital	1 301 349 064	1 625 088 655	974 277 868	1 065 785 554	5 790 013 966
Maintenance Committed	550 846 158	562 730 586			1 569 547 558
Maintenance Not Committed	2 613 706 082	2 987 466 051	2 990 453 518	3 056 243 495	14 008 940 585
Repairs (Malicious or accidental damage)	380 189 441	434 556 532	434 991 088	444 560 892	2 037 739 185
	3 544 741 682	3 984 753 170	3 425 444 606	3 500 804 387	17 616 227 329

Given the size and the cost of facilities, it is quite understandable that the DOD has experienced various challenges. Some of these challenges were highlighted in the DODI of 2000, and the 2015/16 Annual Report:

- The DOD has a constitutional obligation to assist with the reform and the restitution of land.
- A change in force structure requires a change in Defence facilities requirement.
- There is a need for sound FM and EM principles to improve on effectiveness and efficiency.
- The DOD has fragmented FM and EM policies, which leads to fluctuation and inconsistency in service delivery.
- The logistics system is cash based and not an accrual system, and there are more than one logistics system (Department of Defence, 2001).
- The Management Performance Assessment Tool (MPAT) requires departments to perform beyond compliance with regulatory framework.
- The DOD Enterprise Risk Management and Mitigation for 2015/16 identified deteriorating DOD facilities and infrastructure as a risk that has morale implications.
- A new logistic strategy and process framework is required (Department of Defence, 2016).
- The DOD should monitor and report on the implementation of the UAMP.
- Execute the function shift from NDPW to Defence Works Formation (DWF).
- The DOD should engage National Treasury for funding of MTEF to optimise Asset Management and FM plans.
- Ensure that internal budgets are reprioritised and aligned with FM requirements. (Department of Defence, 2016).

In order to address FM challenges the DOD has identified the following initiatives to improve its effectiveness and efficiency to manage its property portfolio:

- Develop an Internal Works Capability with the mandate to provide the DOD with an in-house capability for portfolio management including: FM encompassing facility life cycle management, maintenance and repair, military integrated environmental management and work skills development. This should be done in line with health and safety requirements.
- A nation-wide condition assessment programme.
- A programme to comply with GIAMA requirements.
- A project of migrating the function of life cycle management and custodianship of state-owned property from NDPW to DOD.

- A Defence Estate Strategy that prescribes the total life cycle management of all defence estate from planning stage to disposal stage (Department of Defence, 2011).

In the case of the military units on the west coast of South Africa, it is not clear if FM is aligned to policies, funded, staffed, and empowered to achieve the objectives of the DOD. The UAMP indicates the condition of assets, as a numerical rating where 5 is very good and 1 is very bad, in the four units to be: Langebaanweg (between 3.8 and 4); Langebaan (between 3.61 and 3.8); Saldanha (between 3.51 and 4) and the Military Academy (3.67) (Department of Defence, 2014).

1.3 Problem statement

In the introduction three issues of concern were highlighted. Firstly, that there is a lack of a proper and correct asset register. Secondly, research have indicated that the NDPW is unable to maintain government property. This inability is blamed on ineffective asset life cycle management, no immovable asset management plan, and an urgent need for competent personnel with adequate skills. Adequate skills are required to verify, capture, and correct property data. Lastly, that irregular spending of R35 billion was experienced. As a result the DOD admitted that maintenance on its property was backlogged, that its service delivery was not cost effective, and that its administration and management was not results oriented. The DOD also admitted that the decentralised structure of control and execution is ineffective.

Therefore, it is proposed that the current scope and understanding of FM at military unit level on the West Coast is disjointed.

1.4 Research aim and questions

The aim of this research is to explore current FM practices and understanding at military unit level; to compare it with policy and guidelines, and subsequently, to present a coherent picture of FM at military unit level. The research question therefore is: What is the scope and understanding of FM at the military unit level? The research sub questions are:

- What is FM practitioners understanding of FM at military unit level?

- Are FM practitioners informed to perform FM?
- Are FM practitioners skilled and competent to perform FM?
- Are FM practitioners trained and educated to perform FM?
- Are FM practitioners empowered to perform FM?
- What is the scope of FM at military unit level?

1.5 Research objectives

i. To investigate general FM definitions and competencies.
ii. To identify public sector FM definitions and required competencies.
iii. To identify DOD FM definitions and competencies.
iv. To determine the current scope and understanding of FM practice at military unit level.

1.6 Research proposition

According to Bhattacherjee, (2012: p. 13), "a proposition is a tentative and conjectural relationship between constructs that is stated in a declarative form". Constructs are abstract concepts chosen to explain a given phenomenon and could either be unidimensional or multidimensional. "Facility Officers have sufficient knowledge of facility policies to perform FM" illustrates an example of the unidimensional construct or single characteristic knowledge of facility policies and the multidimensional construct "FM".

Bhattacherjee continues in stating that "… the declarative statement does not have to be true but must be empirically testable using data, so that we can judge whether it is true or false" (Bhattacherjee, 2012 : p. 13). Propositions to be tested in this research will be as follows:

- FM practitioners understand what FM in the DOD entails;
- FM practitioners are informed to perform FM;
- FM practitioners are skilled and competent to perform FM;
- FM practitioners are trained and educated to perform FM;
- FM practitioners are empowered to perform FM.

1.7 Research method

This research is social in nature – it is studying an aspect of the social world. It is based on the interpretivist paradigm that is subjective in nature in forming theory through a process of induction. Because this is a new area of research, the dimensions of the phenomena should be explored, and ideally so, through the use of an instrumental case study. Such an approach will allow for an in-depth and detailed study of participants' perspectives and contextual factors of FM within the bounded context of a military unit.

The research design or comprehensive plan for data collection is influenced and determined by various issues, and it was decided to follow a multi-method approach that will study secondary data, and collect quantitative and qualitative primary data. Secondary data will be identified in the literature review, and the primary data will be collected by means of a questionnaire in a case study. A similar research design was followed in the research of Buys and Tonono (2007), and Dlamini (2009).

The design of the questionnaire was based on previous research questionnaires, secondary data, the research objective and propositions, and guided by ethical principles to ensure that no one is harmed in this research. The ultimate aim was to identify the scope and understanding of FM at military unit level. Use were made of both open-ended (qualitative data) and closed-ended (quantitative data) questions, keeping in mind the need for validity and reliability.

The collection of qualitative and quantitative data (mixed study) negate the negative aspects of the respective methods, and the different sorts of information ensured complementarity (Hammersley, 1996). Quantitative and qualitative data were collected, edited, coded and analysed accordingly. The quantitative data was analysed by means of descriptive and bivariate analysis, and the qualitative data was linked to themes. The findings and results were used to address the research propositions.

1.8 Delimitations and limitations

The general theory on the advantages and disadvantages of exploratory studies, case studies, and questionnaires are acknowledged and not repeated. However, further specific delimitations and limitations relate to the statement: The research on FM at military unit level is conducted by a DOD employee in four military units on the West Coast, during the first semester of 2017.

Delimitations are the boundaries set by the researcher for this research. The research topic, and the resultant research statement and objectives were chosen because of its relevance to the academic qualification sought, and the applicability of the phenomenon within the DOD. Although FM has many aspects and elements, it was decided to limit the research to the scope and understanding of FM at military unit level. This was done so that a military unit FM definition could be developed from the findings of the research.

The four units chosen are geographically close to the researcher but also present three of the four arms of service of the DOD. The geographical proximity allowed for a quick turnaround on the information gathering process. Although it would have been ideal to include all DOD units it was beyond the scope of this research. Officers and non-commissioned officers within the FM environment were selected for this research to limit responses to those people in management positions. The result of having delimitations is that it restricts or limits the inference of findings.

Limitations are the potential weaknesses or shortcomings of research, which could influence the applicability of its findings. Being a senior officer, and being "related" could influence the responses of participants. Responses could be altered to impress or to be "right". There are also the risks of researcher bias and/or lack of objectivity, which were negated with open-ended questions that are not leading in nature and require honest responses.

The four units on the West Coast are geographically far removed from main centres in the DOD and may, therefore, operate differently to those closer to the headquarters. Furthermore, each unit has a different function, structure, size, and support structure which

should be considered. The FM practitioners within these units are few, which limited responses, statistical analysis, findings, and the ability to generalise. The limited time frame restricted the length of responses which affect the scope and depth of findings.

1.9 Structure of research report

The proposed structure of the report shall be as follows:

Chapter one: Introduction

This chapter contains introductory statements as well as a background to the study whereupon the research problem statement is stated. The subsequent research aim, proposition, and objectives, the research methodology, and limitations are introduced and described.

Chapter two: Literature review

The literature review studied the current state of knowledge on the subject of FM in the private and public sector. The review identified key authors, articles, theories and findings in the field of FM with specific reference to definitions, competencies, and challenges. Research on international and national FM practice were examined to determine if the research problem had been addressed and answered.

Chapter three: Asset management in the Department of Defence

Chapter 3 is more contextual in nature by creating a theoretical framework for FM in the DOD. It introduced the period before 1994, the legislative and regulatory guidelines that guides DOD FM practitioners, identify the role players that affect FM at military unit level, and scrutinized the existing DOD policy on FM and EM. The chapter concluded with reference to a draft document on the transformation of FM that gives some guidance as to how FM should be structured and applied at military unit level.

Chapter four: Research methodology

The research methodology chapter presents a discussion on the research process, methodology, and design that should be followed to determine the scope and understanding of FM at military unit level. It highlights the design of the questionnaire, and how the data was analysed, presented and interpreted. Furthermore, the chapter determines the validity and reliability of the questionnaire.

Chapter five: Analysis of data

This chapter contains the analytical framework for the research project where data was analysed and findings presented.

Chapter six: Conclusions and recommendations

The concluding chapter contains the conclusions drawn from the findings. Based on these conclusions, a number of recommendations were proposed and further research and/or development highlighted.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The aim of this chapter is to document a detailed and comprehensive review of the existing literature in order to provide background and rationale on the constructs of the proposition, the research question, as well as the research problem. Therefore, this review identifies key concepts, theoretical frameworks, as well as issues and variables that indicate what FM is and what is required of FM practitioners.

Key authors, articles, theories and findings in the field of facility and asset management will be studied to identify issues and gaps that have a bearing on the research problem. This will be done to determine if the initial research question has been addressed before, or, if the research question should be amended, or, if answers and theories already exist that addresses the problem.

The overview will be both general and specific in nature. This chapter focuses on an overview of FM definitions and competencies in general, on international experiences and challenges of public sector asset management, and conclude with an overview of published research on South African public sector FM. The review of international literature focus on public sector FM guidelines and published research. The review of South African FM focus on research at national and provincial level, at higher education institutions, and universities. Chapter three then completes the theoretical framework with its specific overview of FM within the DOD - how it is structured and should be applied at military unit level.

Creating a theoretical framework for FM is a difficult task because it is still complicated by the confusion and identity crisis that was identified as early as 2001 (Tay and Ooi, 2001). And according to Chung the confusion is increasing: "… operates in an ever widening and ill-defined sphere of activity" (Drion et al., 2012 : p. 257). The confusion is due to the many

opinions on the definition and the scope of FM. On the one hand you have Jones and White, who developed the Royal Institution of Chartered Surveyors (RICS) Public Sector Asset Management Guidelines in 2006, which states that: “The subject is a challenging area for chartered surveyors and other property practitioners, as it requires skill sets that are as much to do with management and business processes as they are to do with mainstream property expertise” (Jones and White, 2008 : p. v). On the other hand, you have someone like Grimshaw, who questions whether FM practice and conduct merits a professional designation (Grimshaw, 2003). Clark and Rees quoted Green and Price who found that academics and professionals in the field sees it as a profession, that FM suppliers belief it to be marginal, and that property professionals merely see it as a business opportunity (Clark and Rees, 2000).

Tay and Ooi (2001) argue that the main problem, and this might apply at military unit level, is that the FM definition and scope is contentious. Therefore, they suggest that a clear role and scope is created in the organisation for FM to develop as a profession. Secondly, they suggest that FM should make a contribution to the bottom line. At military unit level that should be seen as a contribution towards the unit’s objectives as efficiently as possible. And thirdly, provide specialist knowledge and a toolbox for addressing the problems of strategic workplace management (Tay and Ooi, 2001).

2.2 General overview

The first part of the literature review focus on the general theoretical aspects of FM such as definitions, competencies, and tasks in the field of FM. Definitions aim to clarify or give meaning to a term, word, or phrase, but a plethora of definitions can prevent a common platform and the cohesive theoretical development of FM (Tay and Ooi, 2001).

The number of FM definitions is a function of its origins. FM definitions depend on where it is applied, by whom it is applied and, according to Hauptfleisch (2012), what view is taken. Drion *et al*. (2012) in their research concluded that the main contributors to FM definitions are scholars, the FM associations, and facility practitioners. A claim that is substantiated by observations such as: “the inter-relationship amongst practising managers, researchers and educators is the hallmark of EuroFM activity”(Alexander, 2009 : p. 6).

Drion *et al.* in their research quoted various authors who claimed that FM definitions are the result of cost reduction, and a self-maintained and restricting supporting role (Drion *et al.*, 2012). Hauptfleisch (2012), takes a broader approach in summarising the definitions as being the result of a point of view that is taken:

- An organizational view: The organizational context, and the business that an organisation engages in at a particular time, shape facilities. This includes organizational culture, strategy, systems and people. Hence the facility is no longer defined only as the physical structure of the building alone.
- Vehicle of change (Alexander, 2006): Defining facilities as a vehicle of change acknowledge the influence physical surroundings, virtual connectivity and technological systems integration have on shifts in thinking about how we work. The mantra of today is 'interaction and creativity'.
- Product view: A product is defined as 'anything that can be offered to satisfy a need or want' and has two main attributes: features and benefits (Kotler, 1997). Features include functionality, ease of use, 'upgrade-ability', adaptability, aesthetics and useful life. These are the same characteristics that can be used to describe a facility
- Stakeholder view: The stakeholder in the facility is primarily the client or building owner, on one side, and the tenant on the other. Money, time and function are the principle drivers
- Evaluating the risk: Fundamental to the human condition is living with risk. New facilities have an innovative/change risk that applies when physical and emotional boundaries are challenged by new organizational space
- Technological view: Technology is defined as encompassing building systems, architectural structure's office automation, information technology, 'plug 'n' play' furniture systems, management practices and processes (Hauptfleisch, 2012).

Alternatively to Hauptfleisch's views FM could be characterised as either of the following functions: technical, economical, strategic, social, service, or professional (Grimshaw, 2003). Here then follows a brief review of examples of FM definitions as defined by various institutions, individual authors, and in conclusion within the South African context.

The British Institute of Facilities Management (BIFM) is a professional body that promotes excellence in FM since it was established in 1993. It has more than 17,000 members around the world to whom it provides qualifications, training and networking opportunities. The BIFM, on its website, defines FM as: "the integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities". Drion *et al.* (2012) believe the definition appears to be an uneasy

compromise between “hard” and “soft” or rather physical construction and maintenance, and managing assets FM.

Although the European Committee for Standardization (CEN) (Drion *et al.*, 2012) indicated that “clearer definitions and descriptions” are warranted because of a “diversity of concepts and approaches rooted in specific cultural traditions” their definition of FM is exactly the same as that of the BIFM. Cen’s definition lacks any reference to physical assets, land or property, and therefore, could add to the existing confusion. The Facilities Society, on the other hand is more unambiguous.

The Facilities Society is a not-for-profit company that was founded in 2008 to: “act as a Learned Society to promote interdisciplinary academic enterprise in creating, upgrading and sustaining facilities for housing, health care, education, industrial production, commerce, retailing, utilities, communication and transportation” (The Facilities Society, 2014). The Facilities Society defines FM as: “an integrated approach to operating, maintaining, improving and adapting the buildings and infrastructure of an organisation in order to create an environment that strongly supports the primary objectives of that organisation” (The Facilities Society, 2014).

The FM Association of Australia (FMAA) defines FM as: “the practice of integrating the management of people and the business process of an organisation with the physical infrastructure to enhance corporate performance” (Hauptfleisch, 2012 : p. 41). This definition is very similar to the definition adopted by the Hong Kong Institute of FM (HKIFM): “FM is the process by which an organization integrates its people, work process and physical assets to serve its strategic objectives”(Hauptfleisch, 2012: p. 45). The HKIFM acknowledges the different levels at which FM is applied in stating that: “FM is the science and art of managing this integrative process from operational to strategic levels for promoting the competitiveness of organizations” (Hauptfleisch, 2012 : p. 45).

The International FM Association (IFMA) is an international organisation for facility managers that was founded in 1980. It has 24 000 members in 104 countries and is organised in focussed component groups to address issues by region (133 chapters), industry (15 councils) and areas of interest (6 communities). According to the website they "manage more than 78 billion square feet of property and annually purchase more than US$526 billion in products and services" (IFMA, n.d, para. 1-2).

The IFMA defines FM as: "a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology" (Hauptfleisch, 2012 : p. 33). Drion *et al.* (2012) cautioned against such an approach/definition because of the weight allocation to the multiple disciplines. There is also concern that such a definition will allow FM to just being taken up in general business courses as is happening in the USA. The USA have various examples of the under emphasis of FM modules with the over inclusion of "major" and "engineering core subject" in FM curriculums (Drion *et al.*, 2012).

In summary of the confusion, FM is described as: "the integration of processes", "an integrated approach", "a practice", "an organisational process", "the science and art", and "a profession encompassing multiple skills". Each of these definitions have a different outcome which is quite acceptable depending on the organisation: "maintain and develop the agreed services", "to create an environment that strongly supports the primary objectives of that organisation", "to serve its strategic objectives", "promoting the competitiveness of organisation", and "to ensure functionality of the built environment".

A number of authors added some more outcomes. Best, Langston and de Valence (2003 : p. 12) described FM as: "about *empowering people* through provision of infrastructure that *adds value to the processes that they support*. Facility managers are charged with the responsibility of ensuring that the infrastructure is available, operational, strategically aligned, safe and sustainable. Above all, however, facilities must encourage high productivity through a continual search for ways to improve quality, reduce cost and minimize risk".

Atkin and Brooks concluded: "Facilities management can therefore be summarised as *creating an environment* that is *conducive to carrying out the organisation's primary operations*, taking an integrated view of the services infrastructure, and using this to deliver *customer satisfaction* and *best value* through support for and enhancement of the core business" (Atkin and Brooks, 2009 : p. 3-4). Noticeably, none of the above definitions refers to a time aspect although it could be implied.

The South African Facilities Management Association (SAFMA) is a South African FM body, which according to its website, is: "a self-sustaining body recognised locally and internationally for its role in the South African FM community". The SAFMA website provides various definitions, job titles, tasks, and competencies for FM, which provides an ideal theoretical framework for this research. FM according to SAFMA is: "*an enabler* of sustainable enterprise performance *through the whole life management* of productive workplaces and effective business support services." The job titles identified were: Facilities Manager, Head of Facilities, Senior Facilities Manager, Manager – Facilities and Support Services, Workplace Services Contract Manager, Area Facilities Manager, Facilities Account Manager, Head of Property and Facilities, Corporate Real Estate and Services Manager, Projects and Facilities Manager, Facilities and Purchasing Manager, Specialist Facilities Management Engineer, and Facilities Technical Manager (SAFMA, n.d).

Since the Faculty of Military Science is housed by the Military Academy, it is prudent to also refer to the Higher Education Facilities Management Association (HEFMA). This association is an independent organisation for facility managers operating in the tertiary education sector in the Southern African region. Their mission statement also illustrates what FM is in the tertiary environment: "through cooperative sharing of knowledge and resources support and assist members with *achieving the innovative, effective and efficient use of campus facilities and space toward the fulfilment of individual and collective institutional goals*"(HEFMA, n.d).

In conclusion there are common themes/elements but also omissions that are identified from these definitions. Common themes are: integration, people, processes, physical

infrastructure, performance, activities, and objectives. Tay and Ooi add two more elements to the list: focus is on the workplace, and FM is applicable to all organisations because it occupies space (Tay and Ooi, 2001). The omissions to some FM definitions are: strategic orientation; bottom-line emphasis; scope of responsibilities; "hardware" or software" issues; and the life cycle or property life cycle of designing, building, financing and operating (Tay and Ooi, 2001). The biggest problem, however, is not the scope of definitions but the plethora of definitions, and therefore, FM practitioners and we as researchers are still not clear on the roles of FM practitioners (Tay and Ooi, 2001). This research ultimately wants to determine what the role should be, and is, of FM practitioners in the DOD, and therefore, it is necessary to obtain clarity in this regard. Clarity could be provided by considering the competence, competency, and competencies required of FM practitioners.

2.3 Required competencies

As in the case of FM there is also confusion and indiscriminate use of the terms competency, competence and competencies. So much so, that Hoffmann expresses concern about the usefulness of the term (Hoffmann, 1999). In order to clarify the meaning of competencies Hoffmann identified three main positions, with its main contributors, that are used to define competencies:

- observable performance (Boam and Sparrow, 1992; Bowden and Masters, 1993);
- the standard or quality of the outcome of the person's performance (Rutherford, 1995; Hager *et al.*, 1994); or
- the underlying attributes of a person (Boyatzis,1982; Sternberg and Kolligian, 1990) (Hoffmann, 1999).

For the purpose of this research, competencies refer to aspects of the job or observable performance as listed by the BIFM, the FMAA, the IFMA, and the SAFMA.

The BIFM defines competence as "the ability to perform activities to the standards required in employment, using an appropriate mix of knowledge, skill and attitude" (BIFM, n.d). All three elements should be present and developed. The revised BIFM Competences consist of 20 diverse and broad categories of know-how and each has a number of individual elements.

These categories cover both the strategic and operational competencies and span a mix of generic and specialist/technical areas. The IFMA has a list of 11 core competencies that was identified by facility managers from 62 different countries in 2009. The competencies are illustrated in Table 2.

Table 2: FM Competences and competencies (Source: BIFMA, FMAA, and IFMA)

BIFM competences	FMAA competencies	IFMA competencies
• The Business Organisation • Management Principles • Risk Management • Information and Knowledge Management • Project Management • Personal Leadership • Human Resources Management • Relationships with Suppliers and Specialists • Quality Management • Customer Service Management of Property • Property and Building Services Maintenance • Space Management • Support Services Operations • Sustainability and Environmental Issues Energy and Utility Management • Financial Management • Procurement, Contracts and Contract Management • Legislation, Codes, Directives and Regulatory Issues • Facilities Management – Development and Trends (BIFM, n.d)(BIFM, n.d)(BIFM, n.d)(BIFM, n.d)(BIFM, n.d)(BIFM, n.d)(BIFM, n.d)	• Use organisational understanding to manage facilities • Develop strategic facility response • Manage risk • Manage facility portfolio • Improve facility performance • Manage the delivery of services • Manage projects • Manage financial performance • Arrange and implement procurement/sourcing • Facilitate communication • Manage workplace relationships • Manage change	• Communication • Emergency Preparedness and Business Continuity • Environmental Stewardship and Sustainability • Finance and Business • Human Factors • Leadership and Strategy • Operations and Maintenance • Project Management • Quality • Real Estate and Property Management • Technology

The SAFMA (n.d) list of competencies is similar to that of the other institutions but some are coined differently: planning management, innovation, risk management, safety, health,

environment, and quality (SHEQ) competencies (SAFMA, n.d). SAFMA expands on these competencies by identifying the following nine FM tasks:

- Provides a single point of entry for the coordination of all services relating to the efficient and effective running of a Facility. This includes setting up and running a helpdesk for all services and track work as well as customer activities.
- Is responsible for procuring 'value for money' services that perform the clients' requirements.
- Develops the Facilities Management Strategy and Plan, which includes looking at the building in the long term and make sure solutions add value and are not just 'short term' fixes.
- Manage sustainability issues and report on utilities.
- Reduce the impact of the use of facilities on the environment.
- Environmental principles must be applied and reported on.
- Manage large contracts i.e. cleaning & technical maintenance to ensure contractors adhere to agreed standards.
- Implement and report on adherence as well as financial benchmarks for services.
- Is responsible for some aspects of the Occupational Health and Safety Act (SAFMA, n.d).

The most recent FM educational research in the South African context was done by Hauptfleisch (2012), and it is ideal for the creation of a South African FM theoretical framework. Hauptfleisch presented his research at the SAFMA conference on 22 August 2012 where he proposed a South African FM body of knowledge that consists of the following seven areas: management; financing; law; information technology; built environment technology; maintenance; and procurement. Each of the areas includes various elements as illustrated in Table 3.

Table 3: SA FM body of knowledge (Source: Hauptfleisch, 2012)

Management	• General management • Strategic management • Project management • Facilities practice management • Human resources and relations • Marketing • Public relations • Benchmarking • Pre- and post-occupation evaluation • Risk analysis

	• Productivity • Total quality management • Occupational health and safety
Financial	• Financial management • Quantification and tendering • Budgeting and accounting • Life cycle costing
Law	• Commercial law • Contract law • Property law • Outsourcing and service level agreements • Built environment legal framework • Public-private partnerships
Information technology	• General computer skills • Computer aided FM (CAFM) • Space planning information technology (SPIT) • Computerised maintenance management systems (CMMS) • Integrated workplace management systems (IWMS) • Infrastructure life cycle management (ILCM) • Building information modelling (BIM) • Computerised project planning and programming (CPPP)
Build Environment Technology	• Construction technology • Building services/utilities technology • Space management • Renovations and retrofit • Sustainability/green • Pest control • Democracy in design
Maintenance	• Facility auditing/condition assessment • Maintenance and repair management • Hygiene and cleaning
Procurement	• Structure of the built environment • Procurement of goods and services • In-house and outsourcing alternatives

Table 4 highlights the important FM knowledge areas in three different domains: as a managerial challenge; in practice; and in property maintenance (Hauptfleisch, 2012).

Table 4: FM knowledge areas (Source: Hauptfleisch, 2012)

Managerial challenge	In practice	Property Maintenance
• Introduction to facilities management • An overview of facilities management • Development of facilities management • Facilities management practice models • General management fundamentals • Strategic management • Project management • Human resources • Law and contractual arrangements • Finance • Marketing of services • Total quality management • Service level arrangements • Information technology • Successful facilities management	• Structuring the organisation • Client and/or user needs evaluation • Design to satisfy client and/or user needs • Space management • Construction technology, building services and components • Quantification and tendering • Principles of life cycle costing • General services • Capital planning • Procurement and outsourcing • Risk management • Post occupancy evaluation • Benchmarking • The structure of the built environment • Occupational health and safety act and regulations	• Introduction to maintenance management • Maintenance categorisation • Planning and programming of maintenance execution • Operational management • Pest control in buildings • Maintenance finance • Construction, renovation and maintenance work

Tay and Ooi identified the key issues of FM as: location, type, quantity, quality, content, and allocation of workspace. They also see a professional FM manager as someone who is formally trained and has the main responsibility of the strategic management of the workplace (Tay and Ooi, 2001). Langston and Lauge-Kristensen adds that FM responsibilities have increased in scope and now requires facility managers to be: “big picture” oriented, knowledgeable about facilities and customers, adept at financial analysis, able to properly measure facility performance, able to evaluate best options for needs, able to flexibly evaluate and change processes, be a marketer, communicator, and positive advocate for FM (Langston and Lauge-Kristensen, 2002 : p. 6).

Thus far, we have established a general theoretical framework of FM that included definitions, FM competencies, and knowledge areas. In the next section, the emphasis will move towards public sector FM.

2.4 Public sector asset management (International)

This section consists of two parts. The first part briefly deals with a general overview of FM in the public sector, and the second part deals with specific research that has been done by researchers on FM in the public sector. The benefits of this approach are threefold. Firstly, a theoretical framework is created for public sector FM, and secondly, the issues and gaps in public sector FM are identified. Finally, the methodologies used in the quoted research will assist the development of a research methodology in Chapter 4.

The *FM Handbook* by Roper and Payant list some FM issues experienced in the public sector. The public sector FM manager has to deal with facilities far more diverse than in the private sector, and do so with inadequate resources. The public sector has a culture shaped by bureaucracy, where almost every action is governed by a regulation with different priorities. Public sector programmes are run on short-term budgets, where there is never enough money to complete an annual work plan. Change is difficult, especially if it is dependent upon other departments. Maintaining a quality workforce is difficult due to a shortage of managers and trained technical personnel, as well as creating and filling posts. Therefore, the public sector FM manager should be cost conscious, know the system, flexible, legally smart, conscious of regulation, and have special relationships with officials (Roper and Payant, 2014).

The comprehensive work done by Jones and White (2008) is an excellent indicator of the scope of public sector FM. Jones and White were tasked by the Royal Institution of Chartered Surveyors (RICS) to compile a guideline for good property asset management practice in 2006. In creating the guidelines, the authors considered the inputs from various researchers and the practices followed in various countries. Table 5 summarises the asset management policy comparisons of Australia, New Zealand and the USA (Jones and White, 2008).

Table 5: Asset management policy comparisons (Source: Jones and White, 2008: p. 79-80)

	Australia	New Zealand	USA
Regulatory framework	Regulation/accounting requirements (e.g. IAM 2002): • AAS27 (local government) • AAS29 (government departments) • AA31 (government)	Centralised control to legislation; Account reform and asset management reform; The degree of separation of ownership from management and info systems: • *State-Owned Enterprises Act* 1986 • State sector Act *1988* • *Public Finance Act* 1989 • *Fiscal responsibility Act* 1994	Presidential Order: Executive Order (EO) 13327 (Improved Asset Management)
Governance	Australian National Audit Office (federal government); Public Works Committee in respect of major works.	Different Organisations • LINZ • The Treasury • NZ Accounting Standards review Board • NZ Property Institute • NZ Institute of Accountants • Institute of Professional Engineers • Building Industry Authority • Territorial Local Authorities	Government Accountability Office
Extent of devolution	State level government responsibility and regulation	The above organisations set the regulations and standards, whilst many departments, Crown Entities and Crown-owned Enterprises, State-owned Enterprises contract out the property management functions.	
Publications	*Asset Management Handbook*	No central government guidance, although some research being undertaken by the Treasury. The National Asset Management (NAMs) group publish manuals and	Property asset management plan. General Services Administration Department issued material on procedures and progress

		guidelines for best practice.	
Key features	Asset Management should be viewed as a business enabler. Agencies: • lack strategic approach; • are required to use accrual accounting and capital charging; • lack a central register of property assets.	Autonomy for state entities allows innovation and advancement. A capital charge regime focuses entities to reduce capital – virtually all state departmental offices are leased from private sector. Could be seen as a world leader – for example road network management Transit NZ. • Roles and responsibilities are clear • Policy, regulatory functions and operations are separated • Asset management is decentralised and flexible • Private sector management practices are widely used • National wealth accumulated in Crown property is properly recognised fiscal administration and accounting encourage accountability and effectiveness • Accrual accounting is used by all government agencies • Disaggregation of portfolios has led to a reduction in focus on standards of asset management	• High risk federal programme resulting from years of under-investment • Federal property deteriorating badly • Decision makers lack reliable data.

A further benefit to be derived from this study, is the reference to the wide range of skill requirements applicable to public sector asset management (Jones and White, 2008).

According to Gibson these guidelines “take a holistic approach to property asset management from strategy development to implementation” (Jones and White, 2008 : p. vii). Although the guidelines were developed for the national level, it is postulated that if adapted, it can suit the smaller organisation as well. The following key issues are extracted from the guidelines: asset management, property management, performance measures, business process, resources and capacity, and competencies.

Firstly, the term asset is used to refer to land as well as buildings. Secondly, asset management is an activity that ensures the optimal structuring of land and buildings to the best corporate interest of the organisation. Therefore, it focusses on all requirements in order to achieve the operational and financial goals and objectives of the organisation. As a result business and property skills are required, although, just an overall knowledge of property is necessary. Jones and White also concluded that: “it is a corporate, that is whole organisation, activity and may be lead and/or coordinated by a property, construction or facilities professional, although this is not always the case” (Jones and White, 2008 : p. ix). A subset of asset management is property management.

Property management according to Jones and White (2008: p. x) is: “…the activity that ensures that land and buildings matters are dealt with so that they operate efficiently and effectively. It is sometimes referred to as ‘operational’ … it is the activity… professional/technical work necessary to ensure that property is in the condition … form … layout … location … and supplied with the services required, together with related activities… disposal of surplus property, the construction or acquisition of new property, the valuation of property, dealing with landlord and tenant and rating matters, all at an optimum and affordable cost. It also involves offering advice to decision makers on the best ways of doing this. It has a customer orientation. It is normally undertaken by property, construction or facilities professionals and technicians”.

The above-mentioned public FM definitions are closely related to the general definitions mentioned in the previous section. There is reference to integration, assets, operational (vs.

strategic) and financial benefit (bottom line), services and activities, construction and disposal (implies life cycle management), and the best interest of the organisation. However, there is no reference to the management of people or the environment.

Table 6: Performance measures (Source: Jones and White, 2008: p. ix-xi)

Asset base performance measures	Property performance measures
The measures grounded in an organisation's strategic objectives. They fit into four key categories or perspectives, based on the 'balanced scorecard': • Financial – 'traditional' balance sheet and other financial measures. • Customer – satisfaction issues from the customers' perspective. • Internal – the extent to which internal working practices contribute towards the successful delivery of corporate objectives. • Innovation and Learning – intended to help drive improvement in financial, customer and internal process performance. • A fifth category may also be added to address wider social, economic and environmental/physical perspectives, to reflect the wider public policy role of the public sector. The public sector approach would, therefore, cover: • social, economic and environmental/physical impacts; • financial imperatives; • stakeholder views; • internal excellence; and • innovation and learning, and for the future.	More technically based measures than asset base performance measures, property measures are often broken down into a range of more focused component parts normally related to efficiency, effectiveness and economy. Examples are: • costs and cost control; • space utilisation; • service levels and customer satisfaction; • environmental sustainability; • risk management (including health and safety); • in-house services management practice; and • outsourced supplier management.

Reference to the management of people and the environment can be found in the performance measures that are indicated for the strategic objectives of the public organisation. Management of people is grounded in Innovation and learning, which is one of

the four key categories or perspectives (Jones and White, 2008). Reference to the management of the environment is found in an additional category that was created for the public policy role of the public sector. The performance measures for asset management and property management are listed in Table 6.

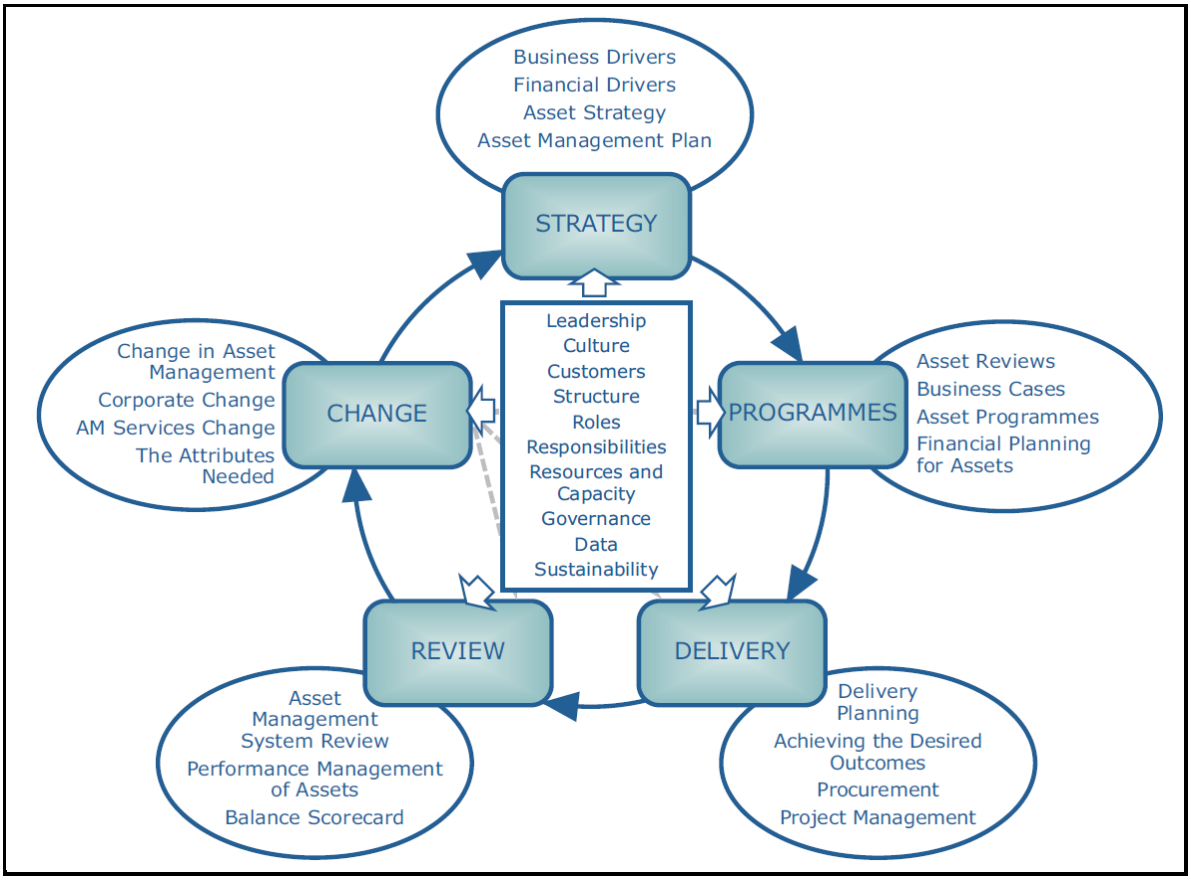

Figure 3: Business process for asset management and supporting activities (Source: Jones and White, 2008: p. 5)

A major contribution made by Jones and White is the development and discussion of the business process for asset management and supporting activities. The process, as illustrated in Figure 3, is an expansion of the basic business process, which consists of a strategy, programmes, delivery, review and change. Asset management, however, requires a number of enabling activities and those are added to the centre of the figure.

Jones and White structured their guideline, and its chapters, according to this process and they stated that it will: “enable the reader to work through the whole asset management process and understand the planning, process, delivery, resourcing, data management and practical implications of preparing an asset plan” (Jones and White, 2008 : p. 8). The chapters are as follows:

- Strategy and vision development
- Asset programmes
- Delivery – Strategic implementation issues
- Review and performance management
- Change management
- Leadership and customers – Leadership for assets
- Organisational issues
- *Resources and capacity*
- Sustainability and corporate social responsibility
- Data and information management
- Asset management – An international discipline

Chapter 9 of the guidelines are of particular interest for this research because it deals with resources and capacity. The chapter examines the strategic aspects of resources and capacity that are needed to support asset management with specific emphasis on definition, contribution to asset management, risks of not addressing training and development, and the role of FM practitioners in training and education. Issues stressed are:

- isolation may occur in case of FM function separation;
- time and effort conflict can occur when FM activities are integrated;
- proper FM requires the necessary resources;
- all relevant personnel, at all levels, need training;
- resources and capacity needs should be considered at three levels: whole organisation, functional and cross-organisational teams, and individuals;
- policies and activities such as:
    - asset management policy which indicates the level of asset management in the organisation. It is a key enabler that sets the scene and impetus for how an organisation approaches asset management as a whole and should include aspects such as guidelines, key performance indicators (KPIs) and published targets;
    - roles and responsibilities which illustrates the organisation’s asset management decision-making structure and ensures that roles are formally made explicit at tactical and strategic levels of the organisation;
    - communication - as it deals with how information regarding asset management is handled, as well as stakeholder, supply chain and management interactions take place.
    - asset management planning which indicates the level an organisation is at regarding formal asset management planning, including life cycle costing, risk management, benchmarking and meeting corporate objectives;

- acquisition and disposal of assets including factors such as: life cycle costing, health and safety, environmental issues, KPIs, risk management, procurement and social aspects;
- operation and maintenance including planned maintenance strategy, risk assessments, cost benefit analysis, training aspects, operation and maintenance plans, responsibilities, ranking of assets in terms of criticality, proactive implementation and evaluation against return on assets;
- review and accounting processes including KPIs, asset registers, training, financial management, roles and responsibilities as well as strategic reviews;
- audit and review of the asset management process including skills and training needs, risk avoidance, use of technology and benchmarking of effectiveness and efficiencies (Jones and White, 2008).

The next chapter investigates the FM policy and guidelines within the DOD, and if the DOD have taken note of these issues as well as the necessary competencies.

General FM competencies have already been discussed, and illustrated in Table 2, and now can be compared to a set of public sector FM competencies. Jones and White identified FM competencies that should allow FM practitioners to balance strategic business skills with asset skills, and a focus on business, people, information and risk management (Jones and White, 2008). These competencies are listed as:

- Strategic business planning
  - Business drivers and strategy thinking
  - Corporate asset strategy
  - Asset management plans
  - Risk management
  - Project and programme management
  - Sustainability
- Leadership
  - Building up capacity and capability
  - Manage strategic change
  - Manage strategic performance
  - Take responsibility for professional resources
  - Leadership/people management skills
- Asset performance management
  - Benchmarking of KPIs
  - Contract management and monitoring performance
  - Customer/stakeholder management
- Financial management
  - Resource accounting
  - Capital and revenue budgets
  - Whole life costing
  - Business cases and option appraisals
- Data management

- The investment in, effective compilation and management of asset registers and the use of information and reports therefrom
- Ensuring validity of data
- Scope, storage and retrieval of data
- Analysis of data

There are no major differences between the above-mentioned competencies and the competencies listed by the BIFM, FMAA, IFMA, and Hauptfleisch (2012), but two issues can be raised. Firstly, the reference to strategic business planning, and secondly, the emphasis on data management. Can and does the DOD employ strategic business planning, and is there the same emphasis and competence in data management?

Chapter 9 is then concluded with the authors requesting a structured and disciplined approach to resource and capacity development to achieve business benefits. According to the authors the approach should determine gaps in existing capabilities and competencies, develop programmes to close the gaps, and continually review resource and capacity strengths and weaknesses (Jones and White, 2008). The authors also warn against resistance to change, and general FM courses which are not organisation specific. The business benefits are:

- release of capital for re-investment or debt reduction;
- efficient running costs;
- better public service provision by improved property and co-location of services;
- property in good condition;
- improved property utilisation and bringing together similar uses into the same property, rather than providing them separately;
- improved productivity, changes in corporate culture and facilitation of corporate change;
- improved delivery of community objectives through the more effective use of property; and
- innovative strategic procurement (Jones and White, 2008).

The RICS guidelines provide a useful theoretical business process but the picture will not be complete if challenges and experiences in the public sector are not considered. In the next section, international and national research on FM in the public sector is scrutinised.

Clark and Rees researched the role of FM within the National Health Service and local government in England and Wales. Of importance for this research is the aim, which was to compare the levels of FM awareness, ability to influence decision-making processes, the

relationship between these factors and the delivery of effective FM, and the relative importance given to FM. The researchers made use of five research projects in both sectors to determine the growth and effectiveness of FM (Clark and Rees, 2000).

One of the results of the research was the significant variation in the Health Chief Executive's knowledge and understanding of FM. Secondly, local government authorities perceived the value set by taxpayers on FM as neutral. Thirdly, that integrated FM was more common in National Health services than in local authorities. However, the research could not prove that integrated FM makes better use of available resources. Finally, the researchers found proof that FM is not a business opportunity in these two public sectors but an integral part of providing the public with best value services. As such the researchers concluded that FM is an expanding function that is gaining status as a profession (Clark and Rees, 2000).

In the previous section, Jones and White listed the guidelines of performance measures for asset management and property management. Brackertz and Kenley agreed that most of these performance measurement models are balanced and incorporates various measures of performance but states that it is limited when transformed to the public sector (Brackertz and Kenley, 2002). Brackertz and Kenley in response developed the Logometrix model which is supposed to be a balanced measurement based on the Service Balanced Scorecard (SBS). The model measures, manages and benchmarks facilities in relation to its ability to enable service delivery and allows Local Government Authority (LGAs) to measure and compare performance of community facilities with other LGAs (Brackertz and Kenley, 2002).

The model has financial and non-financial indicators, and "balances the demands of service delivery with those of maintenance, preservation of asset value, and financial performance" (Brackertz and Kenley, 2002 : p. 1). The authors identified the following six perspectives: service, physical, community, financial, utilisation, and environmental. Each of these perspectives is represented by key performance indicators with underlying element scores. The elements are defined by a number of criteria and are then scored as a functional

requirement and actual performance. Individual facility scores are calculated by adding the weighted scores and then comparing it with other facility scores (Brackertz and Kenley, 2002).

Yusof (2013) in her research wanted to test the effectiveness of policy and did so by evaluating the effect of the Total Asset Management Manual (TAMM), which was implemented by the Malaysian government. Yusof applied exploratory research with both a qualitative and a quantitative approach. The qualitative approach focussed on a literature review of international best practices, and the quantitative approach made use of questionnaires to gauge the collective opinion of Malaysian public property asset managers (Yusof, 2013).

Yusof identified various differences between international practices and what is incorporated in the TAMM but what is key for this research are the findings with regard to asset managers. Although 56% were not aware of TAMM they still felt well equipped for the implementation of TAMM, a result which is quite strange seeing that 50% of respondents "did not understand" and 25% were "unsure" as to what TAMM was. However, it could be due to the fact that the majority felt that TAMM was quite similar to previous asset management practices (Yusof, 2013).

Closer to home Moseki, Tembo, and Cloete (2011) conducted research on the principles and practice of facilities maintenance in Botswana with the main focus on building maintenance. Similar to Yusof both qualitative and quantitative research methods were used to obtain data. Some of the key findings were that respondents found documentation to be important, and that buildings older than five years mostly did not have documentation. Maintenance constraints were listed as lack of training and transport, insufficient funding, poor top management support, limited skilled personnel, unavailability of parts, and the absence of manuals and drawings (Moseki *et al*., 2011).

With regard to outsourcing, it was indicated that 37% of organisations outsource between 80-100 percent of their work. Of the respondents, 39% indicated that the maintenance department was classified as a support function to core business. Twenty nine percent of

professionals managing facilities are from real estate and the property sector. Only 13% were facility managers. With regard to budget estimation, 26% used the previous year's budget, 45% was based on current year requirements/needs, and 23% used information from the repair/history cost file. The difference between proposed budget and approved budget over the last five years varied between 0 and 20 percent for 66% of respondents (Moseki *et al*., 2011).

2.5 Public sector asset management (National)

There is no published "handbook" of FM in the South African public sector, and therefore, the literature review now focusses on research of FM in the South African Public sector. Studies were identified that covered FM at national level (Buys and Mavasa, 2007), (Buys and Tonono, 2007), (Dlamini, 2009), and (Tlhabanelo, 2010), provincial - Eastern Cape (Lazarus and Hauptfleisch, 2010), higher education institutions (Hauptfleisch, 2012), and universities (Molloy, 2012).

Buys and Mavasa studied asset management with the aim of identifying the challenges the National Government face with regard to the management of immovable assets throughout its entire life cycle. The research focussed on three identified key elements of Immovable Asset Management (IAM): IAM plan, asset register, and the performance management system (Buys and Mavasa, 2007). Primary data was gathered through interviews and secondary data by means of a literature review. Questions in the interview focussed on: managers' knowledge of asset management, the importance and effectiveness of asset management, the importance and existence of an IAM plan, the importance and effectiveness of an asset register, the frequency of monitoring asset performance, and the level of performance of assets.

Buys and Mavasa concluded that an accurate asset register is needed to obtain the best functional, social and financial returns on the NDPW property portfolio. Secondly, that "competent personnel with adequate skills to research, verify, capture and correct property

data" are needed (Buys and Mavasa, 2007 : p. 1). Finally, that the Department of Public Works is "currently ineffective in asset life cycle management"(Buys and Mavasa, 2007 : p. 1).

Buys and Tonono published their research on a need for a transformation strategy for FM in the public sector in 2007. In this applied research, the researcher's primary objective was to determine the perceptions and attitudes of people dealing with FM in the public sector, and thereby, determine whether there is a need for a transformation strategy. Buys and Tonono used a quantitative research methodology to obtain data by means of questionnaires. The questionnaires were completed by facilities managers, regional managers and property managers of the National Department of Public Works (NDPW) of the 11 regional offices. Questions were compiled using secondary data that was generated through a literature review of relevant publications and information (Buys and Tonono, 2007).

Descriptive statistical results were generated for FM experience in the public sector, education and training in FM, respondents' ratings of FM definitions, factors stimulating growth of FM, perceptions of FM, information management systems, and FM activities in the respondents' portfolio (Buys and Tonono, 2007).

The 17 responses of the 33 target population indicated that limited funds were spent by government on maintenance; that FM managers are fairly knowledgeable, have limited experience, and are responsible for all FM activities; and that limited use is made of information management systems (IMS). A final conclusion made by Buys and Tonono was that poor FM was not only due to insubstantial budgets but also due to inadequate training and development of facility managers. As a result of their research, Buys and Tonono suggested that more FM programmes be presented by tertiary institutions (Buys and Tonono, 2007).

Dlamini studied the implications and complications of implementing GIAMA at four key national government departments in the Pretoria area as part of a case study. The main aim of the research was to determine if GIAMA will have an effect on the state of public assets; if

government departments have the capacity and capability to effectively implement GIAMA; and if implementation of GIAMA will affect how public assets are managed (Dlamini, 2009).

The methodology, followed according to the author, is descriptive in nature, soliciting primary data through questionnaires and secondary data by means of a review of the literature. A conclusion from this study indicated that respondents have a fair knowledge of GIAMA; are conversant about their roles; are aware of the role of the NDPW; that there are not sufficient resources to implement GIAMA; that personnel are not proportionate to number of assets; that funds are not sufficient for maintenance needs; and that departments think they can do FM themselves (Dlamini, 2009). Of particular concern to this research is the response of the DOD.

The DOD official indicated that DOD properties are in poor condition; that it will take seven to ten years to improve conditions; that there is a shortage of personnel and funds; that GIAMA can be used to motivate for more funds; and that military units be allowed to handle soft and hard services (Dlamini, 2009).

Tlhabanelo studied the role of FM in a non-facilities management organisation such as the South African Social Security Association (SASSA). This case study aimed to identify shortcomings in the policy, programmes and procedures of SASSA's FM unit. Tlhabanelo then designed an in-house checklist and rating scale that can be used as a tool by other organisations to measure their FM capabilities (Tlhabanelo, 2010).

The checklist covers 14 aspects such as FM strategy; alignment with mission, operations, processes and objectives; organisational hierarchy; top management; qualified staff; budget; security and IT; and outsourcing and quality management (Tlhabanelo, 2010). Limitations of the model are that no provision is made for the client's perception of the FM service delivered, or the measurement of assets performance.

Lazarus and Hauptfleisch (2010) researched the implementation of maintenance practices in the public sector in the Eastern Cape with regard to the need, classification, planning,

implementation, impact and cost estimating by property practitioners. The researchers identified key concepts in the literature and then gathered data by means of visual inspection and structured interviews. Interviews were held with property practitioners regarding maintenance practices of property in excess of 100 000m^2. It was found that maintenance was done on a corrective/emergency basis, which led to inaccurate maintenance estimates and as a result overspending and premature replacement. This study allowed the researchers to make comparisons to best practice, highlight shortcomings and list requirements to develop a cost effective maintenance strategy. Most importantly the research highlighted the fact that FM was not implemented as prescribed in the literature (Lazarus and Hauptfleisch, 2010).

Since this research include the Military Academy that hosts the Faculty of Military Science, it was deemed important to cover FM at educational institutions. Roper and Payant indicated that educational institutions had their own vagaries with low budgets, diverse facilities which include endowment property without endowed maintenance budgets, input of engineering and built environment academic departments, and plenty of bureaucracy. To deal with this situation FM managers should be experienced, technically skilled and have an advanced academic degree for credibility. Things are done in a collegial manner, with lots of discussion and meetings, and therefore, educational institutions follow public-sector models of FM (Roper and Payant, 2014).

Hauptfleisch's publication *Facilities Management and Higher Education in South Africa – Opportunities for Improvement* focussed on Higher Education Facilities Management (HEFM). The research surveyed HEFM associations from the USA, UK, Australasia and South Africa to establish their perspectives. The author surmised that these organisations are focussed on the educational environment, that there is no international consensus on a HEFM definition, and that there is no evidence of a body of knowledge/core competencies for the HEFM environment (Hauptfleisch, 2012). Very little detail was available from this research on how universities manage facilities.

In 2016, Molloy completed research on how two different South African universities perform FM. The universities selected were that of Johannesburg and Pretoria. Molloy used a multiple case study with a mixed-method approach in order to obtain both qualitative and quantitative data. The result of the research gives valuable insight regarding key issues such as: structure, centralising and decentralising; service level management; sourcing strategies and alignment with strategic goals which could be considered to improve efficacy of facilities management (Molloy, 2012).

2.6 Conclusion

In this chapter, a theoretical framework was created for FM by identifying various definitions and competencies in general, scrutinising theoretical guidelines for FM in the public sector, and referring to FM research.

FM, also referred to as facility asset management and asset management, are defined in various ways. In essence it is a life cycle approach of integrating processes, people and assets in an effective and efficient manner to achieve the organisational objectives. However, we do not need another definition that contributes to the confusion. There should be only one FM definition in the public sector, which is enhanced by stated competencies. This research found no distinctive difference between private sector and public sector FM competencies in literature.

The comprehensive guidelines of Jones and White were used to determine what FM in the public sector entails. The guidelines, amongst others, identified definitions and performance criteria for asset management and property management, a management process, and addressed the strategic aspects of resources and capacity. Given the context of this research note should be taken of strategic business planning and data management competencies, as well as the development of resources and capacity.

The reviewed research on FM experiences outside South Africa identified a lack of knowledge and understanding at top management levels; questioned integrated management;

questioned the applicability of theoretical performance models in the public sector; and tried to gauge FM practitioner opinion on Malaysian FM policy. Research on FM experiences in Botswana established the importance of documents in FM; found older documents to be missing; and maintenance constraints to be the absence of training and transport, insufficient funding, poor top management support, limited skilled personnel, unavailability of parts, and the absence of manuals and drawings.

The South African public sector FM research that was reviewed found the NDPW to be ineffective; that competent people are required; that asset registers be kept; that FM practitioners are knowledgeable, have limited experience, and are responsible for all FM activities; that limited use is made of IMS; and that poor FM is due to insubstantial budgets and inadequate training and development. Lazarus and Hauptfleisch (2010) also found maintenance was done on a corrective/emergency basis which led to inaccurate maintenance estimates, and as a result, overspending and premature replacement.

There is no evidence thus far that the scope and understanding of FM at military unit level has been addressed, which highlights the research gap that exists. However, issues such as understanding, knowledge, use of documents, training and funding were mentioned in public FM research and are included in the further development of this research. This chapter focussed on FM in general and started to investigate the South African public sector FM but the scope needs to be narrowed down to the Department of Defence. In the next chapter, FM within the DOD is investigated to determine what FM is and how it should be applied at military unit level.

CHAPTER 3: ASSET MANAGEMENT IN THE DEPARTMENT OF DEFENCE

3.1 Introduction

In the previous chapter a detailed and comprehensive review of the existing literature was completed in order to provide background and rationale on the constructs of the proposition, as well as the research problem. A theoretical framework was created in studying key concepts, issues and variables that influence, describe and set parameters of the research topic which is FM at military unit level.

Different definitions and competencies were identified from the literature for FM in general. Furthermore, issues and gaps were identified in research done on public sector FM internationally and nationally. In this section, focus will be placed on how facilities, or rather assets, should be managed in the DOD. Specific answers are required for the following questions: What guides FM and FM managers at military unit level? What is FM in the DOD? How is FM structured in the DOD, and in military units? What capabilities/competencies are required of an FM manager at military unit level? What resource and capacity development, and career opportunities exist?

This chapter starts with brief reference to the period before 1994, move to the legislative or regulatory guidelines which every FM manager should be aware of, and then focus on role players, and policy for FM in the DOD. The Chapter conclude with answers to the FM at military unit level questions posed in the previous paragraph. Chapter Four then address the methodology to be applied in measuring and evaluating FM practices and experiences at military unit level.

3.2 Historical background

According to the report "Transforming Facilities Management in the Department of Defence", which was compiled in 1998, FM in the SANDF historically had three key areas: land, buildings and the environment (Logistics Division, 1998).

The report mentions that land and building FM initiatives started to escalate in the late 1970's when the Chief of the South African Defence Force (CSADF) recognised the importance of good planning and orderly development in the RSA. The Chief of Staff Logistics and other divisions were then instructed to get involved in the State's spatial planning activities and as a result took part in various regional planning activities in the then four provinces. Since then roles and responsibilities have developed and been promulgated in various FM policy documents and guidelines (Logistics Division, 1998).

The environment plays an important role in any military operation, and therefore, there should be concern for environmental issues. Consequently General Magnus Malan gave instruction in 1997 that the SANDF should consider the environment on SANDF properties. The long term strategy for Environmental Services in the SANDF was formulated and accepted by the military top management and. Wynand Breytenbach, the Deputy Minister of Defence, in 1992. From then onwards Environmental Services was accepted as an official function within asset management (Logistics Division, 1998).

The report defined FM as: "the management of buildings, land and the natural environment in an integrated way so as to promote the success of the core processes of the organisation, and the management of the impact of the organisation's activities on the environment in which they are carried out" (Logistics Division, 1998 : p. 5). The report concluded that facilities should be "purposefully managed as an integrated system where such management relates to the act or art of directing facilities with a degree of skill" (Logistics Division, 1998 : p. 5). These definitions are taking an organisational view with the strategic function of supporting organisational activities. Comparing these definitions to those mentioned in the previous chapter, they are similar to the BIFM definition with inclusion of the HKIFM reference to "art".

There is no reference to the hard aspects of physical construction or SAFMA's "whole life" time aspect.

Before 27 April 1994 immovable properties of the state were registered to various authorities such as: the Union of South Africa, the RSA, the TBVC states, provincial administrations, the South African Development Trust, the Community Development Board, Education trustees and Hospital Trustees, and office bearers such as the Governor-General, State President, Minister of Lands, and various others (Logistics Division, 1998). Ownership was then separated with legislation in 1993.

3.3 Legislative framework

The Government exercises control and regulation over the functions of each of its departments through its laws and policies. All state departments, and therefore also the DOD, should structure its internal policies consistent with broader government laws and policies. Ultimately, the policies will instruct facility or asset managers what to do. The DOD has to consider the following acts: the Public Finance Management Act, the Government Immovable Asset Management Act, the Defence Act, the Defence Endowment Property and Account Act, South African National Heritage Act, and other legislation which falls outside the scope of this research.

All of these acts are founded on the Constitution of the Republic of South Africa which, amongst other things, separated the ownership of state-owned immovable property. The Consitution allocated ownership to the National Government and Provincial Governments and to the DOD according to Annexure D to schedule 6, and specifically Annexure D(7), subsection (4) of the Constitution:

*Subject to and in accordance with any applicable law, **the assets**, rights, duties and liabilities of all forces referred to in section 224 (2) shall devolve upon the National Defence Force in accordance with the directions of the Minister of Defence.*

With the right to ownerships also came the responsibility not to: "encroach on the functional integrity of government in another sphere (Section 41(1)(g))". As a result, all assets owned by

the State were now moved under the control and guardianship of the Department of Public Works except for those in compliance with section 28(1) of the Constitution, and section 42 of the Public Finance Management Act (PFMA) such as government endowment property (GED) (Department Public Works, 2014).

The PFMA, Act No. 1 of 1999, which was amended by Act No. 29 of 1999, is the second piece of legislation that shapes how assets are management in the DOD. The PFMA does not define facility or asset management but states that: all revenue, expenditure, assets and liabilities …are managed efficiently and effectively…" (Republic of South Africa, 1999 : p. 1). The PFMA determines that the Accounting Officer of the DOD is the responsible person for the management, safeguarding, and maintenance of assets of the DOD (Republic of South Africa, 1999). As reported in the User Asset Management Plan (UAMP) the PFMA requires: "a high standard of professional ethics, reasonable and equitable allocation, efficient and effective utilisation towards optimum public satisfaction, value for money and accountability for public resource management" (Department of Defence, 2014 : p. 12). The PFMA, as referred to in the UAMP, set the following requirements for the DOD:

- Understand and meet the requirements for DOD facilities.
- Provide the required accommodation for DOD purposes in an efficient and cost effective way.
- Ensure the optimal utilisation of all facilities within the DOD's portfolio.
- Maintain and enhance the value and image of DOD facilities.
- Create a safe and suitable working environment.
- Contribute to the attainment of government's broad socio-economic objectives (Department of Defence, 2014).

So far, no mention is made of assets and/or facilities. The Government Immovable Asset Management Act (GIAMA) No. 19 of 2007, however, refers to asset management. GIAMA has as its aim: "To provide for a uniform framework for the management of an immovable asset that is held or used by a national or provincial department; to ensure the coordination of the use of an immovable asset with the service delivery objectives of a national or provincial department; to provide for issuing of guidelines and minimum standards in respect of immovable asset management (IAM) by a national or provincial department; and to provide for matters incidental thereto" (Republic of South Africa, 2007 : p. 3). So, is FM now asset

management? Is there a difference between the two? This could be problematic for research on FM and needs to be clarified.

In the previous chapter, distinction was made between property management and asset management. Assets were defined as land and buildings, and asset management as an activity that ensures the optimal structuring of land and buildings to the best incorporate interest of the organisation. Cloete provides a more detailed explanation in quoting Pritchard who defined asset management as: “the process of creating a register of assets, recording details of planned work, scheduling of work and recording details of work done in order to create financial or technical history of the assets” (Cloete, 2002 : p. 5). Spedding, according to Cloete, defined asset management as: “ the operation and conservation of property” (Cloete, 2002 : p. 6).

Cloete concludes with the SAFMA definition, as already mentioned in Chapter 2: “FM is the management of specific physical entities to enable the business to carry out its core function” (Cloete, 2002 : p. 10). Two questions need to be answered. What does GIAMA refer to? Is the FM practitioner at military unit level busy with asset management or FM?

To answer the first question, and to increase understanding of public sector FM, proper scrutiny of GIAMA is required. Section 4 of the GIAMA confirms the custodianship of the Minister of Public Works, but limits its scope in tasking organs of the state to determine the following objectives:

- Provide a uniform immovable asset management framework to promote accountability and transparency with government.
- Ensure effective immovable asset management within government.
- Ensure coordination of the use of immovable assets with the service delivery objects of a national or provincial department and the effective utilisation of immovable assets.
- Optimise the cost of service by ensuring accountability for capital and recurrent works; the acquisition, reuse and disposal of immovable assets; the maintenance of existing immovable assets; protecting the environment and the cultural and historic heritage; and improving health and safety in the working environment (Republic of South Africa, 2007 : p. 6).
- Clarify the role of custodians and users in relation to immovable assets owned or leased by the state.
- Outline the principles of immovable asset management to be maintained by government.

- Impose a duty on the Accounting officer of every user and custodian to submit immovable asset management plans in accordance with the PFMA and the Public Services Act, Act No. 104 of 1994.
- Determine the minimum content of asset management plans.
- Provide for the administration of the Act, such as exemptions, delegation, and assignment, offences and penalties, as well as for the Minister to issue standards and guidelines for immovable asset management, with the concurrence of the Minister of Finance and the Minister of Public Service (the legal status of these standards and the guidelines are also determined).
- Enable the Minister of Public Works to make regulations and regulate the matter in the transitional period by suspending requirements if and where (Department of Defence, 2014 : p. 12-13).

Furthermore, GIAMA highlights important aspects such as an IAM definition, user requirements and responsibilities, the strategic planning process, operation and maintenance planning, an IAM plan, and impact of the UAMP. GIAMA defines IAM as: "those management processes which ensure that the value of an immovable asset is optimised throughout its life cycle, which encompasses strategic planning, acquisition, operations and maintenance management and disposal, as well as measuring the performance of immovable assets in user and custodian departments" (Republic of South Africa, 2007 : p. 4) . The definition per se sets requirements and responsibilities for the user.

Requirements

- Reviewing infrastructure needs through a strategic needs assessment.
- Analysing its infrastructure inventory, utilisation, performance of the infrastructure against the required functionality and condition of the infrastructure, and developing an infrastructure acquisition and surrender plan.
- Using the information from the above to develop an operational plan for the infrastructure in support of the service delivery that will include, but not be limited to, the operations, operational maintenance, reactive and programmed repair and refurbishments.
- Budgeting for the operational plans and any new acquisitions.

Responsibility

- To develop a User Asset Management Plan (UAMP)

According to GIAMA the strategic planning process, which is part of the first requirement, should link the service delivery strategies with the immovable assets, to identify gaps, and to

fill those gaps by means of acquisition. Operation and maintenance planning is required to indicate how immovable assets will be maintained, operated and disposed (Department of Defence, 2014).

GIAMA requires an IAM plan for all immovable assets within the custodianship of the organ of state and it should be submitted annually to Treasury so that it can advise on strategic plans and budgetary allocations. The IAM, which now becomes the User Asset Management Plan (UAMP), should guide decisions of the user. It is important to note that the main aim of the UAMP is that it should reflect "the paradigm shift that must filter down from Senior Management to Force Structure Elements (FSE) level and should be reflected in budg*et all*ocation" (Department of Defence, 2014 p. 14). The UAMP if completed will provide statistics on required performance standard, accessibility, suitability, condition, operating performance and functionality rating. These statistics could be correlated with the scope and understanding of FM at military unit level.

In conclusion, the asset management referred to by GIAMA entails more than just keeping registers, records, and schedules, or, operating and conservation of property. It requires the optimisation of value, budgeting, strategic planning processes, linking service delivery with immovable assets, and life cycle management. In managing physical entities to enable the core function, which is delivering a defence service as defined in the Defence Act, the process is deemed to be FM and not asset management as defined by Cloete.

The National Defence Act, No 42 of 2002, which has the aim to provide for the defence of the RSA and for matters connected therewith mentions "facility" twice and "asset" three times. At no stage is asset management or FM mentioned or defined (Republic of South Africa, 2002). However, Section 80(2) (a) and (e) of the National Defence Act allows the Minister of Defence to "acquire, hire, construct and maintain defence works, ranges, buildings, training areas and land required for defence purposes" as well as "sell, let or otherwise dispose of any land or building which is no longer required for defence purposes" (Republic of South Africa, 2002 : p. 45).

Section 4 of the GIAMA indicated that not all assets are within the custodial rights and powers of the Minister of Public Works and this is confirmed in Section 1 of the Defence Endowment Property and Account Act, Act 33 of 1922. Defence Endowment Property (DEP) is defined as: "All lands and interests in land in the Union heretofore held by or reserved for the use of His Majesty's War Department, as specified in the Schedule to this Act, shall, together with the buildings on such lands, be deemed to have been or to be transferred to the Government of the Union as from the date specified opposite the description of the property in the said Schedule and shall be held by it subject to the provisions of this Act and subject also …" (Republic of South Africa, 1922 : p. xxxiv) .

In short it means that land, buildings and interest in the RSA which belonged to the UK (War Department) and was transferred to the Government of the Union in 1921 to hold, use and conserve exclusively for the benefit of Defence Force Organisations now belongs and falls under the custodianship of the DOD (Department of Defence, 2001). However, ownership/custodianship was to be determined by means of an analysis of the property portfolio and proof of title deed so that it can be disclosed as Immovable Tangible Capital Assets in the DOD's Annual Financial Statements. These properties are: Land and Buildings, Leases and Agreements and Servitudes. It is the responsibility of the Defence Works Formation to update the immovable asset register on a monthly basis and Directorate Facilities should update and maintain the DEP portfolio (Department of Defence, 2001).

The South African National Heritage Act, Act 25 of 1999 guides the protection and management of the immovable heritage sites. In the DOD immovable heritage sites could be: buildings, heritage sites/facilities, graves, cemeteries, infrastructure, memorials and monuments. Endowment property and immovable heritage assets' duties and activities are delegated from the Secretary for Defence to the Chief Logistics of the South African National Defence Force who is the responsible regulating authority. The executing authority is the Defence Works Formation who is responsible for:

- the management of capital works, refurbishment projects, planned maintenance and decentralized projects;

- responsible to make adequate provision for every aspect relating to financial and budgetary requirements, giving effect to this framework through the appropriate structures at the appropriate levels;
- authorised to develop, implement and maintain appropriate management mechanisms within the Defence Works Formation concerning the implementation of this framework; and
- accountable for compliance with this policy framework (Logistics Division, 2013).

Other legislation that is applicable to the management of immovable assets in the DOD are:

- The Occupational Health and Safety Act, Act No. 85 of 1993, as amended;
- National Building Regulations, as stipulated in South African National Standards (SANS) 10400 – 1990;
- The National Environmental Management Act, Act No. 107 of 1998, as amended;
- The Intergovernmental Relations Framework Act, Act No. 13 of 2005, as amended by Act No. 56 of 2002;
- The Construction Industry Development Board Act, Act No. 38 of 2000, as amended; and
- The Broad-based Black Economic Empowerment Act, Act No. 53 of 2003 (Department of Defence, 2001).

Thus far, regular mention has been made of the Department of Public Works and Defence Works Formation and before these role players are discussed in more detail it is important to take note of the FM role players in the DOD and their responsibilities as guided by the FM Strategy of the DOD.

The formulation of the FM Strategy of the DOD is consequent to the above-mentioned acts, white papers, defence reviews, various other legislation, and the process is as follows: Government guides the National Security Policy and Strategy; The DOD Strategy provides the Secretary for Defence (SecDef) and the Chief of the South African National Defence Force (CSANDF) with a basis to determine activities and required resources; the Military Strategy then provides general guidelines for force provision and force employment by means of strategic objectives, strategic concepts, and strategic capabilities; the support strategies will be included in the Military Strategy; and included in the support strategies is the FM Strategy (Department of Defence, 2009).

Table 7 illustrates a summary made with the input from various documents to the level in the DOD organisational structure, the role player, as well as some of the main responsibilities of the FM role players. The organisational structure of the DOD is built on 5 levels: The Minister

of Defence and Military Veterans is at level 0; Level 1 is the CSANDF and Secretary of Defence; Level 2 consists of the DOD Central Staff, General Support (Including Logistics Division with Directorate Facilities (DFac)), and different Arms of Service (SA Army, SA Navy, SA Air Force, SA Medical Health Services.); Level 3 has the Logistical Support Formation, followed by Level 4.

Table 7: DOD FM role players and their responsibilities (Source: Logistics Division, 2013, DOD, 2000, DOD, 2011, DOD, 2013)

Level	Who	Responsibility
2	Logistics Division, Directorate Facilities (D Fac), Sub-directorate Facility Life Cycle Management, Divisional Liaison Officers for FM (Strategic level)	• Define DOD FM System • Develop plans for: acquisition, leasing, disposal, and maintenance, facilitate the determination of priorities, rates and taxes, upgrading, and environmental management. • Ensure visibility of DOD facility plans to councils and DPW. • Develop Administrative, Operational and Technical policy to guide FM in divisions and services. • Monitor implementation of facilities policy with IG. • Create single line of FM communication. • Assisting and advising on service level agreements (SLAs). • Establish and maintain lines of communication with DPW and department of Environmental Affairs. • Disclosure of the DEP portfolio. • Services/Divisions level 2 structures are to report all decentralized projects to D Fac.
3	Defence Works Formation, Log Support formation, and Service/Divisions FM structure (operational level)	• Continuous consultation with divisions, services and Directorate Facilities on execution of facility plans. • Analysis and input to update plans and priorities. • Oversight of large-scale DOD facility activities. • Co-ordination of corporate level execution of FM. • Co-operating in priority determination. • Render facility related professional services and advice to Divisions and Services. • Manage Regional Interface Management Offices (RFIMs). • Liaise with DPW on execution of DOD facilities plans. • Detailed information on projects applicable to the DEP portfolio; • continuous update of the Immovable Asset Register;

		• separate lists of projects ito the different programmes, including planned maintenance; • financial progress reports on all projects on DEP; • evaluate all management information received from Level 4 and provide to Level 2 for disclosure in AFS; and • provision of all additions for the year under review.
4	Services and Divisions Officer Commanding (Military Units), and RFIMs	• The RFIMs were to co-ordinate, develop, execute assist the day-to-day running of FM activities with GSBs. The GSBs are no longer in existence, and therefore, these activities are no longer relevant. • RFIMs are responsible for regional level DOD FM planning and execution. • FRIMs should assist with setting priorities and liaise with DPW and provincial Department of Environmental Affairs. • Notify the DWF of all decentralised projects on Defence Endowment Properties. • Authorisation should be obtained from NDPW through the DWF for the utilisation of containers as accommodation. • The Immovable Asset Register should be constantly updated through the Regional Works Units.

This research wants to focus on the FM managers at the military unit level but thus far there has been limited reference in the Acts and DOD documents to level 4 FM activities. Unit FM activities, however, are influenced by Department of Public Works and Defence Works Capability, and therefore, needs consideration. Also, reference should be made to the DOD Instruction which is the Defence policy that guide all activities within the DOD. This contextual analysis then concludes with reference to military unit level FM.

3.4 National Department of Public Works

The National Department of Public Works (NDPW), as already indicated, is the custodian of all government immovable assets excluding Endowment Property, and as such should:

- meet the requirements of occupants, client Departments, and ultimately the general public as end-users;
- to provide the required accommodation for all national government departments (clients) in an effective, efficient and cost effective way;
- to ensure the optimal utilisation of all properties within the government's property portfolio;
- to maintain and enhance the value of government's property assets; and

- contribute to the attainment of government's broad socio-economic objectives (Department of Defence, 2001).

Custodianship or control over the assets implies the control of the economic benefits or service potential and not physical control. The management of immovable assets in the DPW is regulated by the Immovable Asset Management Policy, effective from 1 April 2013. The purpose of the policy is to provide the Property Management Trading Entity (PMTE) with a basis for the accounting and management of immovable assets. The PMTE is the trading entity of the DPW, as required by the PFMA. The policy does not mention facilities but defines IAM as: "those processes which ensure that the value of an immovable asset is optimised throughout its lifecycle" (Department Public Works, 2014: p. 5), and maintenance as: "work carried out at a certain frequency to sustain functionality of the asset or prevent breakdown" (Department Public Works, 2014: p. 5).

With regard to the effective and efficient management of the immovable assets, the DPW has to adopt policies on: planning and budgeting, acquisition, operation and maintenance, disposal, safeguarding, procurement and supporting documents, and performance management. The Chief Financial Officer of the DPW is to ensure that users understand and implement the policy. Provision should also be made for formal training of key users (Department Public Works, 2014).

In order to save on high maintenance costs, the DPW can request all government departments to scale down on fixed property holdings. Redundant properties should be handed back to DPW which will re-allocate it within the provincial and local governments (Department of Defence, 2001). However, this is a troublesome relationship.

In the DOD annual report of 2015/2016 it was reported that the maintenance backlog is increasing due to the low expenditure on planned maintenance by DPW. In 2015/16 the DOD spent R478.6m on refurbishments, which was equal to 57% of the annual target. In the same period only R245.1m (26.8%) of the R914.3m that was handed over to DPW, was spent on planned maintenance. As a result the NDPW experienced a backlog of R6.8 billion which

necessitated the inclusion of a clause in the Service Level Agreement (SLA) between the DOD and NDPW to change the trend (Department of Defence, 2016).

However, things did not improve enough so the DOD developed a need for an in-house portfolio management capability, and therefore, established and are capacitating the Defence Work Capability (DWC). The DWC would be responsible for an FM encompassing facility life cycle management, maintenance and repair, military integrated environmental management and work skills development (Department of Defence, 2009).

3.5 Defence Works Capability

The Defence Works Capability (DWC) was established as a result of the Department of Defence (DOD) Strategic Work Session from 21-23 June 2006, and the Minister of Defence Work Session of 23 March 2007. In 2009, the operationalisation of DWC and fixing of the DOD infrastructure was listed as one of the top priorities, and in March 2009 the Military Command Council authorised a mandate for the establishment of a DWC with FM and construction capabilities. As a result, this led to the integration of FM structures of C Log (DFac and DFSM), Project LEBAKA and the Service Corps. The DWC is to be coordinated by Chief of the SA Army for the DOD (Department of Defence, 2009).

According to the Defence Estate Strategy the Works Capability has an establishment of 450 personnel including technicians, project officers, artisans, and supervisors. These people are responsible for level 1 and level 2 maintenance activities. Level 1 refers to minor works by the unskilled, and level 2 refers to maintenance by skilled artisans and no structural alterations (Department of Defence, 2011).

The FM Strategy (FMS) aims to provide strategic direction for FM in the DOD. The FMS defines FM as: “planning, organising, directing, control, administration and execution in the Maintenance and Construction of facilities as well as Environmental Management” (Department of Defence, 2009: p. 2). The definition does not address life cycle or full life management, and it has no defined objective or goal.

The four levels of facility support provided by the DWC are indicated in Table 8. As part of facility support the DWF is required to provide output deliverables and capabilities. The outcome deliverables required of the DWC are: appropriate, ready and sustained facilities; facility maintenance, construction and post-conflict reconstruction capability; and effective, efficient and economical environmental services. The capabilities required are: direction for FM, real estate management: facility maintenance, repair, and construction; facility maintenance and construction (FMC) skills development; military integrated environment management; general support services; and research and development (Department of Defence, 2009).

Table 8: Levels of Facility Support (Source: DOD, 2009)

Level	Who	What
1	Force Structure Elements (FSEs)	Minor maintenance work on existing infrastructure. Services should ensure that FSE are structured appropriately for this need. This includes cleaning and gardening services in accordance with the base maintenance organisations.
2	Qualified artisan	Major maintenance works on existing infrastructure.
3	Qualified team of artisans	Alteration or addition to existing facilities. This is determined by scope and size of and will be project driven (sic). These tasks can be combined with second line tasks as mentioned above.
4	A complete construction capability	The provision of totally new infrastructure.

In order to produce deliverables and illustrate capabilities, it is necessary that the DWC appoint qualified tradesmen and support personnel, establish an information communication system, and have the necessary capital equipment in the form of equipment, tools and

accessories. Furthermore, a total budget, ETD, and a regional FM capability must be provided (Department of Defence, 2009).

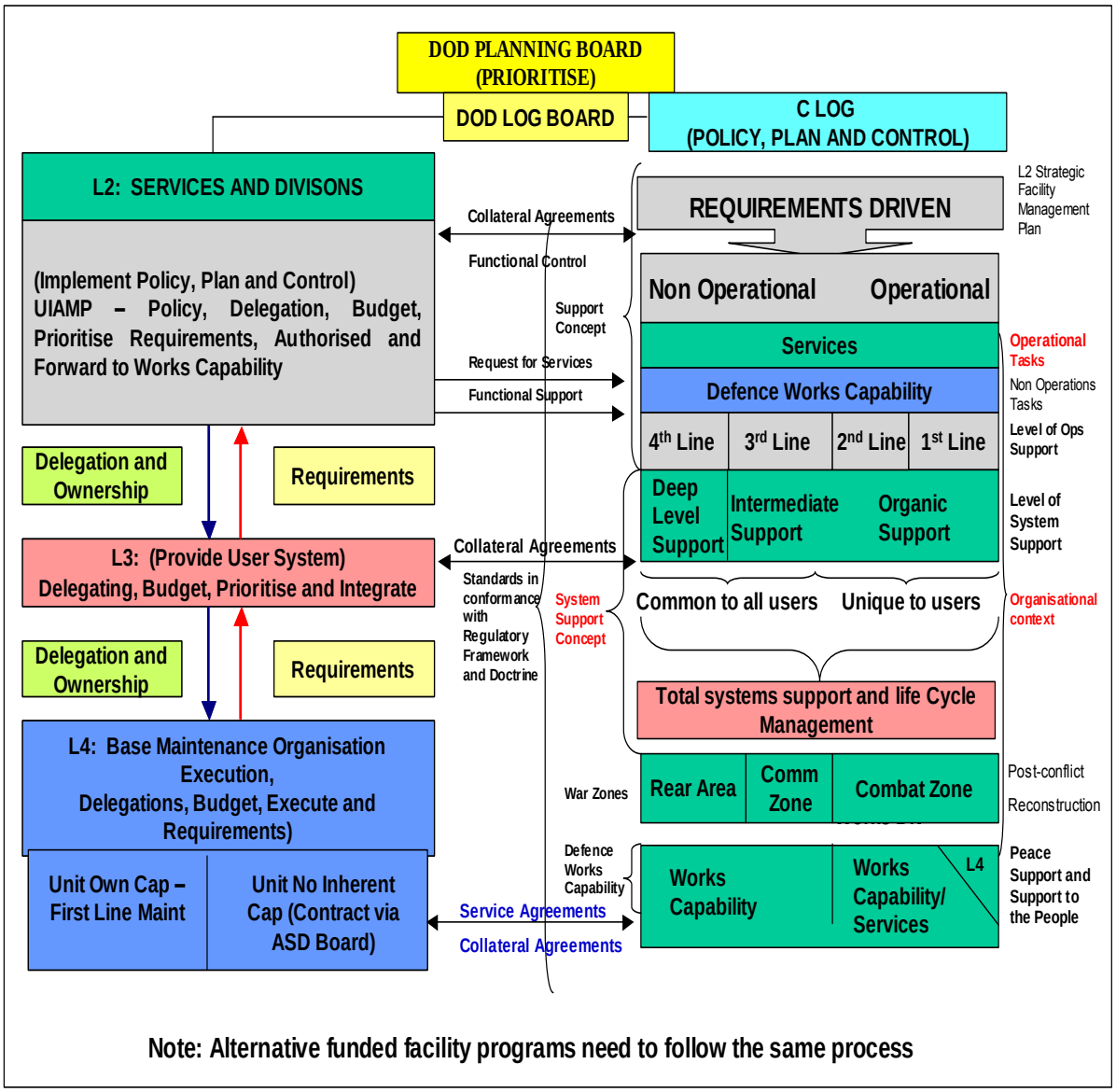

Figure 4: Defence Works Capability Concept of Operations (Source: DOD, 2009)

The DWC developed a Concept of Operations as illustrated in Figure 4 to illustrate the functioning of the DWC and how the strategy should be implemented at the various levels: Level 2= direct and control, Level 3 = to provide user systems, organise and administrate, and Level 4 = base maintenance execution. The levels are now briefly reviewed.

Level 2, which provides policy, plan and control measures to all levels of facility maintenance and repair should delegate to Levels 3 and 4 the responsibility for maintenance and repair of

facilities and land with their inherent capability. Level 3 should provide a user system with delegations, budgets, and integration to Level 4 FSE.

Level 4 Force Structure Elements, where the units are situated, should have the capability to: "render first line facility maintenance and repair tasks as well as adhering to environmental rules and regulations" (Department of Defence, 2009 : p. 12). Units should plan, budget and execute for first line FM activities. If the unit does not have the capability, a Service Agreement (SA) should be established with the DWC to render this service. Clarification of budget responsibilities in such a case should be reflected in the SA. A specific procedure is to be followed to formulate requirements and specifications of FM maintenance and repair. If the DWC cannot render the service, the unit should follow an Alternative Service Delivery (ASD) process to obtain the service required. The management and funding for the alternative arrangement remains that of the unit (Department of Defence, 2009). It is foreseen that the ASD will be replaced by DWC in the future.

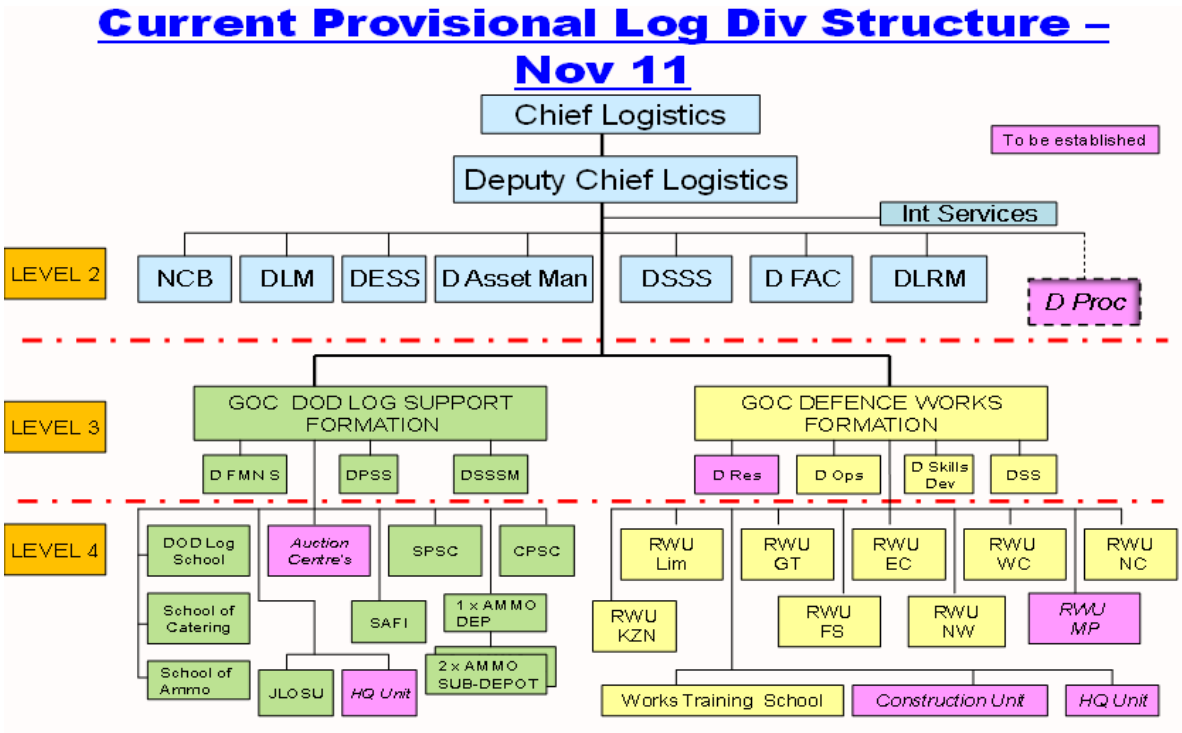

Figure 5: Current Provisional Logistics Division Structure (Source: CSIR, 2012)

Figure 5 illustrates the new organisational structure for FM in the DOD as proposed by the CSIR (CSIR, 2012). DWC will include DFac (Level 2), DWF (Level 3,) and Regional Work Units (RWU) at military unit level (Level 4). Currently, DWC's integration is still a work in progress and not yet completely implemented. Therefore, the search continues for an instruction on what FM should look like at military unit level. Unit activities are regulated by DODIs, and therefore, DODI: Policy and Planning No 00033/2000 will now be considered.

3.6 Department Of Defence Instruction: Policy and Planning No 00033/2000

DODI's are DOD internal policy documents and are there to provide guidance with regard to processes and procedures that should be followed. DODI: Policy and Planning No 00033/2000 addresses FM and Environmental Management (EM). FM is addressed using a life cycle approach consisting of acquisition, utilisation, maintenance and disposal phases.

The DODI does not include any definition of FM but does indicate that "the delivery of FM support should be such that it enhances or promotes the successful execution of the core business of the DOD organisation". Base EM is defined as: "the management of built-up environment and surrounding natural environment. This includes waste management and pollution control". Facility is defined as: "a broad term that refers to land, buildings, natural resources, infrastructure and any other fixed property used by the DOD" (Department of Defence, 2001 : p. 5).

The policy addresses the national importance of issues such as: land reform; the acquisition, utilisation, maintenance and disposal of land and facilities; environmental management; and the promotion of private and public sector maximisation of scarce resources. The policy then addresses the FM system, EM, Joint-use of Defence Facilities, and the disposal of Defence Facilities in detail.

Of particular importance for this research is Chapter 3 which deals with the FM system. This chapter illustrates in detail the organisational set-up that had to be developed to address the problem of duplication of control and execution functions of decentralised FM that was

mentioned in Chapter 1. Therefore, a new structure was developed which created a single point of entry between DOD and DPW at regional and corporate level; a single structure with no duplication; a single line of communication; integrating immovable asset management and EM; and performance and service delivery agreements. A brief discussion will now follow on this proposed structure, which is illustrated in Figure 6 and starts with decision-making in the FM environment.

The DODI indicates that Defence facility decisions are made similar to other resource decisions and that a generic process is used to determine the Defence facilities required by DOD divisions. Provision of facilities are based on vertical (Performance), and horizontal (Service) agreements (Department of Defence, 2001). Performance agreements (PA) are put in place for subordinate organisations to deliver output as required by Government. Users of facilities will enter into service agreements (SA) with the Service Provider (Department of Defence, 2001).

As illustrated in Figure 6 the Ministry of Defence has a PA with the Chief Joint Support (CJ Sup) to provide efficient facility services to all DOD corporate divisions. CJ Sup has two PA's and one SA. CJ Sup has a PA with Chief of Logistics (C Log) to ensure all logistical support systems and processes are in place and working effectively. CJ Sup also has a PA with General Officer Commanding of the Log Support Formation for deeper log support to the DOD. Then there is an SA between CJ Sup and the Chiefs of Divisions on provision of facilities support (Department of Defence, 2001).

C Log has a PA with Director Facilities to ensure an effective FM system in the DOD is in place and working effectively. The GOC of Log Support Formation has a PA with both the sub-directorate Facilities Management Support and the Regional Facilities Interface Management Offices (RFIM's). The first PA is to ensure that sub-directorate Facilities Management Support execute corporate level FM services, to render specialist services and to co-ordinate/oversee the execution of of FM services at regional level. The second PA is with the RFIM's to ensure that defence FM is executed effectively in the regions. The RFIM has a PA with General

Support Bases (GSB's) to ensure that the clients (units) are satisfied in accordance with departmental policy and procedures (Department of Defence, 2001). This is a top down process and from the military unit level it is as follows:

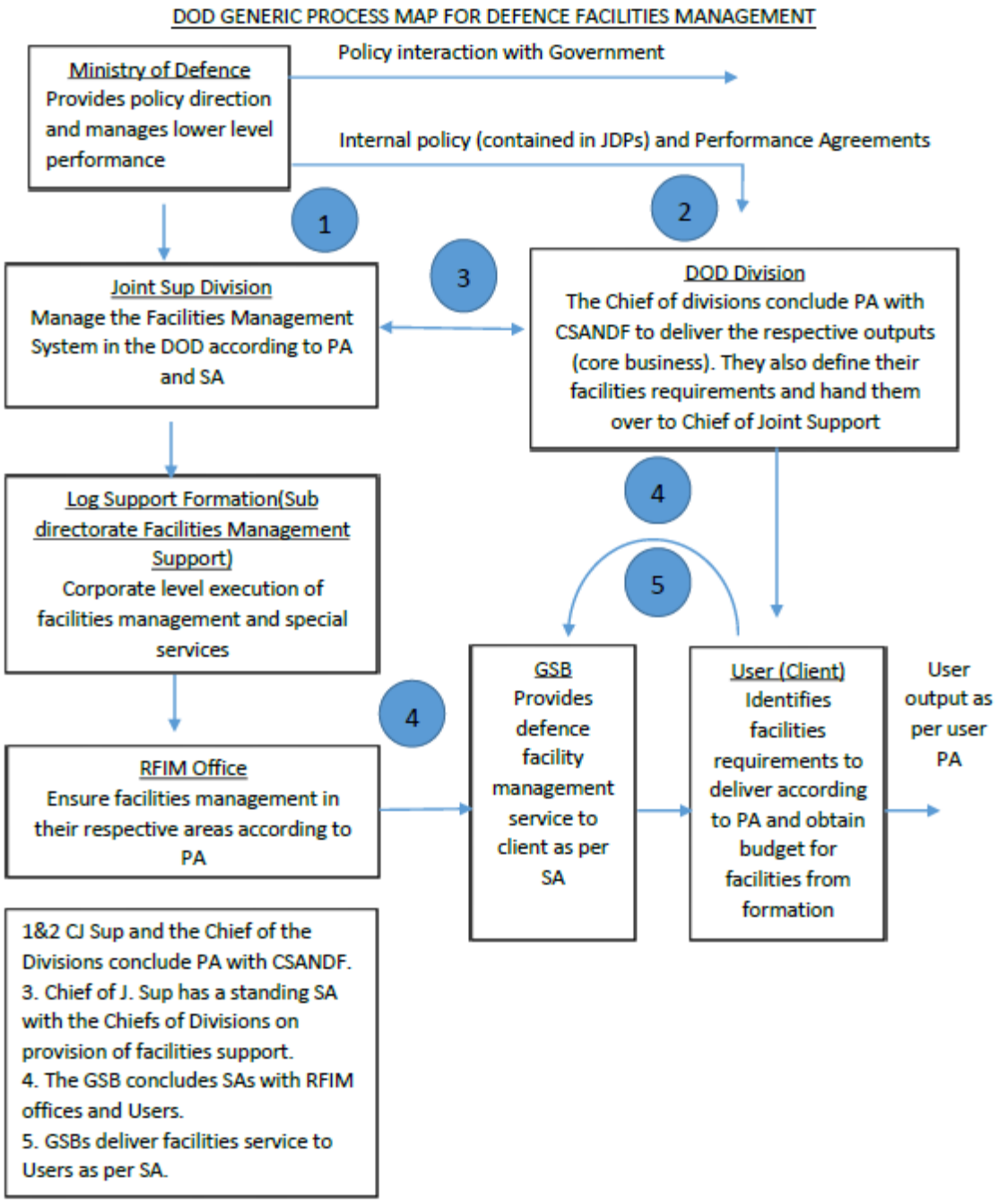

Figure 6: DOD Generic Process Map for Defence FM (Source: DOD, 2001: p. 38)

General Support Bases (GSBs) were earmarked in the DODI to ensure that services are delivered to military units according to specification, timeframe and budget, and to report on performance. Units, on the other hand, had to ensure effective and efficient implementation of the SA, had to budget for its own FM needs, identify and forward its requirements to GSBs timeously, and maintain and forward performance reports. If the GSB did not have the capability to perform the task, it had to liaise with the RFIM who in turn would liaise with the Regional Office of the DPW or the Log Support Formation (Department of Defence, 2001). Flow charts are included in the DODI to indicate the processes to be followed for day-to-day maintenance, repairs and maintenance, and planned maintenance by military units.

Currently, GSBs are phased out, DWF is work in progress, the DODI has not been amended, and day-to-day activities will still influence the DOD and its ability to achieve its objectives. The above acts, policies, or strategies, although clear on the general scope and expectations are not clear on what exactly is required at military unit level for FM. The only document that could shed light on what FM entails at military unit level is a draft document *Transforming of Facilities Management in the Department of Defence*, dated 20 July 1998. This draft has a chapter on Base Level Facilities Management that gives useful detail on what the organisational structure should look like and what is expected of FM practitioners.

3.7 Base level facilities management

Military bases or units all look different because of the inclusion or exclusion of accommodation, administration buildings, sickbays, shooting ranges, training areas, hospitals, messes, air strips or docking facilities. Some bases host more than one unit and some consist of units that are geographically dispersed. As a result there is no one-size-fits-all and no detailed manual for the structure and scope of FM in military units except for the generic guideline proposed by Logistics Division in a draft document.

The draft suggests that both FM and EM be represented at military unit level. Therefore, there should be a facilities manager (major) and an environmental officer (major) that forms the Base HQ. The senior of the two will be the facilities section head. It is not clear if seniority is

according to rank, years' service or qualifications – most probably rank. The environmental officer should be suitably qualified, and it is also noted that these appointments should not get involved in physical execution as it could lead to "mis-utilisation of qualified staff officers" (Logistics Division, 1998 : p. 21). The base execution element would be managed by a Warrant Officer I who will be responsible for the following functions:

- Accommodation and reporting centre;
- Facilities maintenance;
- Base (Environmental) management;
- Environmental management of training areas and other natural property.

The functions in Table 9 were identified for the Base HQ staff and the Base Execution staff and are to be considered when a questionnaire on scope of FM practices is constructed.

Table 9: Proposed DOD FM and EM structure, levels and functions (Source: Logistics Division, 1998)

	Levels	Functions
Base HQ Staff	Facilities Management	• Identify FM issues and formulate corrective measures; • Advise Base Commander on FM matters; • Determine needs for new facilities and formulate staff target and staff requirements; • Compile and manage the budget required for the total spectrum of FM; • Serve on Regional PWD-DOD Liaison Forum as well as on Facilities working group; • Give inputs for strategic direction process; • Evaluate proposals/requests for military and non-military use of fixed assets; • Determine requirements for scheduled and re-active maintenance and submit to RFIM; • Determine requirements for disposal of facilities; • Supply FRS related information to RFIM for inclusion in FRS; • Guide and oversee the execution of FM activities; • Liaise with PWD Building Manager.
	Environmental Management	• Identify environmental issues at the base and formulate corrective measures; • Advise the Base and Unit Commanders on EM matters;

		• Formulate the whole spectrum of EM plans with the assistance from the RFIM office; • Compile annual programs for execution by the execution cell; • Compile and manage the budget required for the total spectrum of EM; • Serve on Regional Environmental Forum as well as Environmental Working Group; • Give inputs for strategic direction process; • Evaluate proposals/requests for military and non-military use of military land; • Identify potential/need for awarding of special conservation status and do necessary staff work; • Liaise with surrounding communities; • Execute base level communication plan; • Environmental education and training of members served; • Participate in environmental research; • Formulate annual entries for Environmental Award Programme; • Participate in external projects; • Guide and oversee the execution of EM activities.
Base Execution Staff	Accommodation	• Allocation of state accommodation; • Reporting centre; • Feed information on occupation of state accommodation to RFIM office for inclusion in FRS.
	FM	• Day-to-day unscheduled maintenance • Emergency maintenance; • Manage contractors
	Base EM	• Manage waste management; • Manage horticultural services; • Weed and erosion control in base area; • Beautification in base.

	EM of natural properties	• Execution of annual environmental programme base area:
		  • Soil erosion control;
		  • Alien invasive control;
		  • Bush encroachment control;
		  • Game management;
		  • Maintenance of firebreaks;
		  • Maintenance of fences.
		• Execute environmental clean-up.

Two main questions now remain for this study. Firstly, is this the way FM and EM is structured in military units, and secondly, are these the FM and EM activities that are performed on a day-to-day basis?

3.8 Conclusion

FM and EM practices in the DOD received much attention in the 70's and have been guided by various acts, regulations and policies ever since. The Constitution and PFMA does not define FM but allocated assets, and asset management requirements and responsibilities. GIAMA was introduced in 2007 to provide a uniform framework for the management of immovable assets. The GIAMA confirmed NDPW custodianship but limited the scope of responsibility in tasking organs of state with its own objectives, requirements and responsibilities.

GIAMA defined IAM as: "those management processes which ensure that the value of an immovable asset is optimised throughout its lifecycle…" which confirms that the DOD should be busy with FM and not asset management as claimed by Cloete. The National Defence Act does not define FM, hardly refers to assets or facilities, but allows the Minister of Defence to deal with assets for defence purposes. The Defence Endowment Property and Account Act limits the custodianship of DPW and places FM responsibility on the shoulders of the Minister of Defence.

Three role players were identified that influence the activities of FM practitioners at military unit level. They were DPW, DWC, and GSBs. DPW is the custodian of all assets excluding DEP and are responsible for the supply, maintenance, enhancement and optimal use of accommodation that meets the requirements of the national departments. DWC was established in 2006 when the DOD became disenchanted with the performance of DPW. DWC defines FM as planning, organising, directing, control, administration and execution in the Maintenance and Construction of facilities as well as Environmental Management. DWC is structured from level 3 down to level 4 where military units find themselves.

The policy that guides FM in the DOD was formulated in 2000 and has not been renewed ever since. The DODI uses the term FM, and although it is not defined, it is required to be such that it enhances or promotes the successful execution of core business. The policy refers to EM in an FM system (structure) that includes GSBs. The GSB was supposed to ensure that services are delivered to military units according to specification, timeframe and budget, and to report on performance. If the GSB could not perform the work, it had to refer it to the RFIM's who would consult the regional office of the DPW or the Log Support Formation. However, since the late nineties the GSBs have been phased out, the DODI has become outdated, and the earmarked DWC is still a work in progress.

In summary, various acts, regulations and policies guide FM practitioners at military unit level but there is no definitive document that guides or regulates FM at military unit level. Therefore, there is no official FM structure, guidelines for the roles and responsibilities of FM practitioners, resource and capacity development, or career opportunities. So what is going on in military units?

In the next chapter a research methodology is developed to examine the practice and scope of FM in military units.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

Chapter 1 provided a conceptual framework followed by the theoretical framework in Chapters 2 and 3. These frameworks illustrated FM definitions and competencies in the private and public sector. The theoretical framework found that although the DOD, as part of the public sector, is guided by various acts, regulations and policies for FM or asset management in the DOD, there is no definitive guide for FM at military unit level. In other words, there are no theoretical formal FM structures, guidelines for the roles and responsibilities of FM practitioners, resource and capacity development, or career opportunities in the DOD.

This chapter presents a discussion on the research process, methodology and design that was followed to determine the scope and understanding of FM at military unit level. The chapter highlights the design of the questionnaire, and how the data was analysed, presented and interpreted. The validity and reliability of the questionnaire is also determined.

4.2 Research process

The research process that is followed is the one proposed by Zikmund (2003) that consists of 6 stages, as illustrated in Figure 7. The first stage is the discovering and definition of the problem, the selection of exploratory research techniques and the statement of the research objectives. The second stage is the planning of the research design, which entails the selection of the basic research method. The third stage deals with sampling and the selection of the sample design. Data is then gathered in the fourth stage, edited and coded so that it can be analysed in the fifth stage. In the sixth stage, conclusions are drawn and presented in a report.

Before the stages are discussed, it will be prudent to take a step back and have a look at the research methodology – the study of the methods used to gain knowledge.

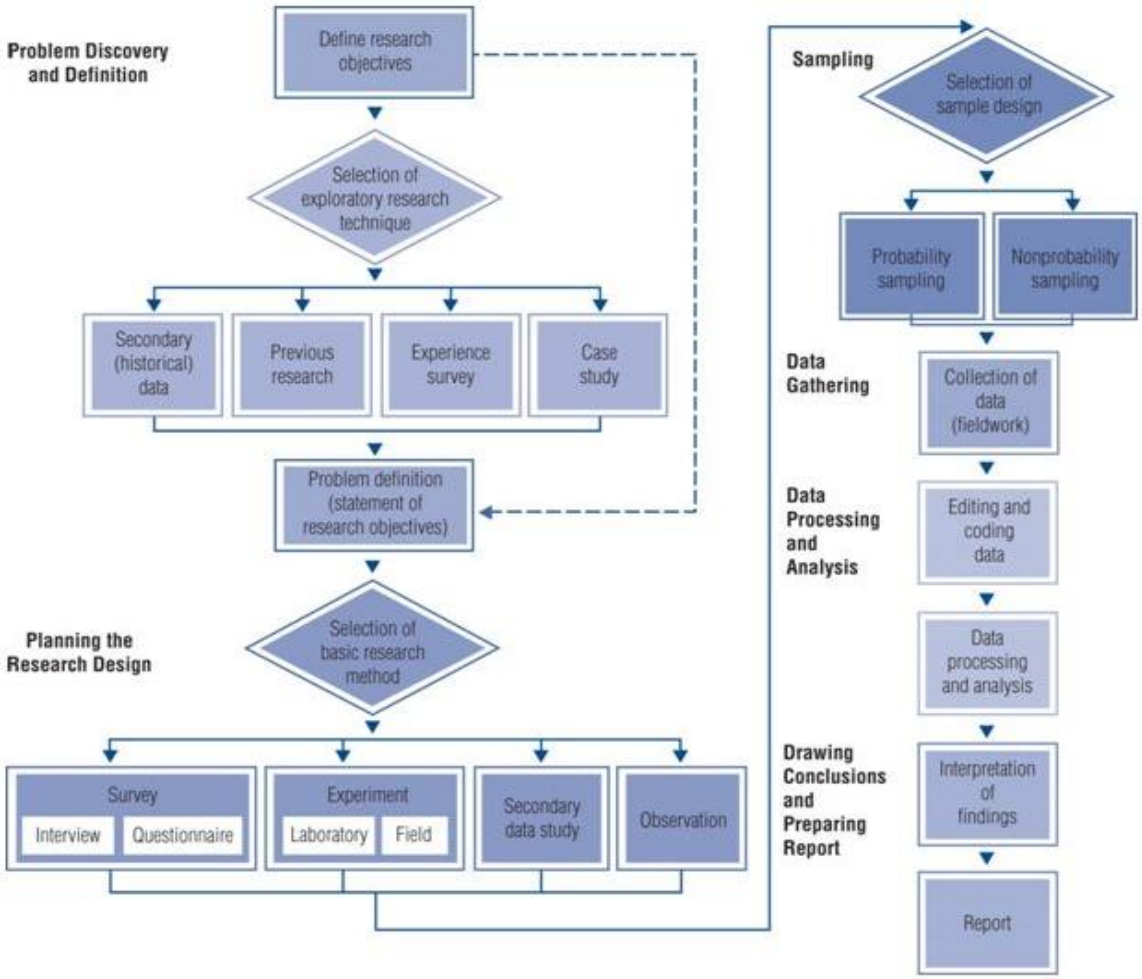

Figure 7: Flowchart of the research process (Source: Zikmund, 2003: p. 61)

4.3 Research methodology and method

This research is social in nature, as it investigated an aspect (FM) of the social world or phenomena (military units). The process of social research involves the definition of a research question or statement and then gathering data on the phenomenon so that the question can be answered or the statement be responded to (Quinlan, 2011).

The methods of data gathering is built on underlying concepts and theories. These are the different social research paradigms or fundamental philosophies that developed since the 1800's. In reply to the natural sciences it started as being positivistic – trying to explain by means of quantitative research in the form of numbers and statistics (Bhattacherjee, 2012). However, social research is also interested in people's experiences, expressions, and understanding or meaning of social phenomena and social experiences which are qualitative

in nature. As a result an interpretivist or social constructivist paradigm framework was developed that interprets the world subjectively and result in multiple realities (Bhattacherjee, 2012; Quinlan, 2011). This is the research approach that was followed in this study.

Firstly, an interpretivist approach was most suitable for this study, because it is not possible to separate the research question from the environmental context. Secondly, the results and answers required are subjective in nature, and finally, this research makes use of an inductive process to form a theory on FM in military units. In order to develop a theory there are three types of research that could be followed: explanatory, descriptive and exploratory research.

Explanatory research seeks to explain or provide answers to the why and how questions, or the causal factors and outcomes. Put differently, it seeks explanations for the "observed phenomena, problems, or behaviours" (Zikmund, 2003 : p. 6). To identify *how* facilities are managed at military unit level, which is the aim of this research, would require that the scope of the particular phenomenon is known.

The scope of FM can be determined by means of either descriptive or exploratory research. Descriptive research makes careful observations and detailed descriptions of the population or phenomenon (Bhattacherjee, 2012 : p. 6). Answers are determined for the *how* as well as the *who*, *what*, *when*, and *where*. However, descriptive research is not as useful in new areas of research such as determining the scope and understanding of FM at military unit level.

The research question for this research focuses on "what the understanding and scope is…" which is exploratory in nature and according to Yin (2014: p. 10) "a justifiable rationale for conducting an exploratory study". Exploratory research is more suitable to determine the dimensions of a phenomenon or situation and results in new ideas and further research in public FM.

Part of the first stage of the research process is to determine an acceptable exploratory research technique. The most appropriate research technique is influenced by the

fundamental philosophy, the type of research, as well as the focus of the research, the research question, and the type and location of data (Quinlan, 2011). Although there are various research techniques, there are mainly four which are ideal to obtain insights and clarify the problem. These techniques are secondary data analysis, pilot studies, surveys, and case studies which are now discussed briefly (Zikmund, 2003; Quinlan, 2011).

Secondary data analysis or meta-analysis is a methodology that makes use of existing data to complete a quantitative analysis (Bhattacherjee, 2012; Zikmund, 2003). This methodology was applied in Chapters 2 and 3 as a literature review to determine how FM is defined, and what the required competencies are in the private and public sector respectively. The theoretical disadvantages of using secondary data also proved true for this research. The data is outdated (old policies), and not suitable for this scenario (no documental guidance for unit FM).

A second technique considered, and applied, was that of the pilot study. FM practitioners at the Military Academy were approached informally to gather data but the data could not be used because the Military Academy is unlike any of the other three units on the West Coast, and the data lacked precision. Therefore, this technique was also found to be unsuitable.

Surveys are the collection of information on a wide range of cases on a specific topic to draw conclusions. According to Bhattacherjee (2012 : p. 39) field surveys ”capture snapshots of practices, beliefs, or situations from a random sample of subjects in field settings…through a structured interview”. Although surveys provide external validity due to field settings, and it can deal with many variables and multiple perspectives, it is not appropriate for this research. Surveys are respondent bias and non-temporal which will negatively affect the internal validity of this research (Bhattacherjee, 2012).

Case studies, or case research, was defined by Yin (2014: 16) as: “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident”. Blatter (2008:68), as cited by Boodhun (2016), stated that a case study is: “a research approach in which one or

a few instances of a phenomenon are studied in depth", and Quinlan (2011) added that a case study studies a situation that is similar to the problem situation. However, whether a case study is suitable for this research depends on various conditions, and the benefits and concerns of case study methodology.

Yin (2014) listed four conditions that should be considered: the type of research question posed, the extent of control of the researcher, the focus on contemporary rather than historical events, and when the boundaries are not clear between the phenomenon and the context (Baxter and Jack, 2008). Based on these conditions a case study approach is most suitable because the research question for this research is exploratory in nature, requires no control from the researcher, focusses on current FM practices and how it compares to historic policies and guidelines, and the boundaries are not clear between military unit FM and public asset management. As in the research of English, Basckin, de Jager and Nassimbi (2012), as referred to by Potgieter (2016), the participants' perspectives and contextual factors are important to the inquiry and the phenomenon should not be detached from its setting.

Many benefits will result from using a case study. Firstly, FM at military unit level can be studied in depth with attention to detail that facilitates richer and more holistic research (Warburton, 2016). Secondly, case studies can be used from a positivist or interpretive perspective – theory testing or theory building. A further benefit is that research questions/statements can be changed during the research – unlike in the case of positivist research. Case studies afford the researcher the opportunity to study the phenomenon at various levels in the military unit with the input from multiple participants, and in the words of Zainal (2007: 4), as quoted by Warburton (2016), case studies "are equally adept at qualitative and quantitative research".

Although quantitative and/or qualitative data from case studies can be used to assist in building FM theory, note should be taken of the concerns identified by Yin (2014), Quinlan (2011) and Bhattacherjee (2012). Yin (2014: p. 19-21) listed concerns or prejudices such as: lack of rigor, confusion with case studies used for teaching, little basis for scientific

generalisation, long processes and lengthy documents, and unclear comparative advantages of other research methods. Further concerns are the generalisation of situations that are atypical (Quinlan, 2011; Bhattacherjee, 2012), and the lack of experimental control, which can influence the internal validity of inferences (Bhattacherjee, 2012).

The purpose of this study is not to generalise but rather to start generating theory on FM at military unit level and in the words of Yin (2014: p. 16) there is a need to "understand a real-world case and assume that such understanding is likely to involve important contextual conditions pertinent to your case". Further motivation for using a case study are the examples of relevant FM research by Dlamini (2009), Tlhabanelo (2010), and Molloy (2012), as referred to in Chapter 3.

Case study research can include either single or multiple case studies (Yin, 2014). According to Yin (2014) single case studies have multiple components (embedded cases) and multi-case studies are replicated over separate instances. Stake (2006: p. vi) stated that multi-case study is "a special effort to examine something having lots of cases, parts or members", and Stewart (2012) postulates that all multiple case studies are comparative in nature. Even though data will be collected from four different military units this research does not want to draw comparisons between cases, and therefore, will make use of a single case study.

Although Stake (1995), according to Zucker (2009), distinguished between intrinsic, instrumental, and collective case studies, Stake (2006) also admitted that case studies can be both intrinsic and instrumental. An intrinsic study "provide insight into an issue" (Zucker, 2009: p. 3); according to Stake (2005), as cited by Boodhun (2016), it is a study that focusses on its own singularities and ordinary attributes; or according to Zainal (2007) is studied for its own sake (Zainal, 2007). Instrumental case studies, according to Zainal (2007) selects a group of subjects to examine patterns; according to Zucker (2009), to provide insight into an issue; and according to Stake (2005) as cited by Boodhun, where the case under study is of secondary interest. Therefore, this is an instrumental case study. So what is the case under study and the unit of analysis?

The case represents the topic of the study and in this research it is FM in military units. Yin (2005) states that the unit of analysis is the source of information and Miles, Huberman and Saldana (Miles *et al.*, 2013: p. 28) elaborates in defining the unit of analysis as: "a phenomenon of some sort occurring in a bounded context". Therefore, the unit of analysis will specify what the case is about and should be: the understanding and scope of FM at military unit level.

The conclusion of the first stage is the definition of the research problem, the research question, and the statement of the research objectives. The formulation of the research problem is essential for success, or, as Einstein put it: "the formulation of the problem is more essential than its solution" (Zikmund, 2003). The research problem was stated in Chapter 1 as: The current scope and understanding of FM at military unit level on the West Coast is disjointed, and therefore, the research question is: What is the scope and understanding of FM at the military unit level? The research objectives as stated in Chapter 1 are:

i. To investigate general FM definitions and competencies.
ii. To identify public sector FM definitions and required competencies.
iii. To identify DOD FM definitions and competencies.
iv. To determine the current scope and understanding of FM practice at military unit level.

The next stage, Stage Two, is planning the research design. This is the master plan, framework or blueprint which will specify the actions, methods and procedures for collecting and analysing the needed information.

4.4 Research design

"There is no single perfect design. A research method for a given problem is not like the solution to a problem in algebra. It is more like a recipe for beef stroganoff; there is no one best recipe" (Simon, 1969 : p. 4). Bhattacherjee adds in saying that irrespective of what design is chosen the researcher should aim to collect as much, and as diverse as possible, data about the phenomenon (Bhattacherjee, 2012).

Bhattacherjee (2012 : p. 35) defines the research design as the "comprehensive plan for data collection in an empirical research project". Data collection entails the identification of the source of data and the asking of questions, and both these activities are guided by the research objectives as mentioned in the previous section. Secondly, the collection of data, and therefore, the research design depends on:

- *if findings should be descriptive or causal in nature?* In this research it is descriptive in nature.
- *If objective answers can be found by asking people?* There is limited documentation available on the scope and understanding, and therefore, FM practitioners at military unit level were asked about their activities and understanding of FM.
- *How quickly information is required?* This research were completed by June 2017.
- *How survey questions should be worded?* No leading questions and worded according to the military context.
- *How experimental manipulations should be made?* No experimental manipulations were made. (Zikmund, 2003 : p. 105)
- *What research instruments will be used to gather data?* Questionnaires were used to collect primary data, and a literature review to collect secondary data.
- *IF questionnaire – what kind? How will it be constructed? Pre-tested? Distribution, retrieval, collation?* This is discussed in *Questionnaire Design*.
- *Procedure* which could be = construction, validation, distribution, retrieval, collation, presentation and interpretation of data.
- *Who will gather the data?* The researcher constructed, validated, distributed, retrieved, collated, presented and interpreted the data. The Statistics Department at Stellenbosch University assisted.
- *How much supervision is needed*? Supervision was limited to ensure that respondents are not influenced.

As a result, a multi-method approach was used because multiple sources of data are involved. The first three research objectives require an exploration of the existing literature, which is secondary data, and this has already been noted in Chapters 2 and 3. Although the literature review identified various aspects relevant to the fourth research objective, more data is required. In an effort to gain more insight a few interviews were conducted with FM practitioners in a pilot study but due to the inaccuracy and non-representivity of data from such a method it was decided to develop a questionnaire.

Questionnaires are widely used and if highly structured require limited action of respondents. As a result it motivates responses, and if properly constructed, provides the required data

(Quinlan, 2011). Questionnaires present the further benefits of low cost, little time and high standardisation (Bless *et al.*, 2006). Due to the fact that there are only four units and very few FM practitioners within each of these units a drop and collect (self-administered) questionnaire was used to ensure a high response rate.

Stage three of the research process deals with sampling. Although all military units should have a facility management function, questionnaires were only issued to FM practitioners in the four military units situated on the West Coast. The four military units are Air Force Base (AFB) Langebaanweg, 4 Special Forces Regiment (SFR) Langebaan, SAS Saldanha, and the Military Academy in Saldanha. These units are in close proximity and represents the FM practices of three of the four Arms of Service: SA Army, SA Air Force, and the SA Navy.

FM falls within the logistical environment of military units next to base maintenance and environmental management. These three activities could be combined or managed independently at various levels by different ranks. The aim of the research was to approach all of these FM practitioners in management capacity, and therefore, to exclude manual labourers in these departments.

Getting responses from managers raises two important issues. Firstly, the approval of all Commanding Officers for the research; and secondly, the ethical considerations associated with such research.

Because this research involved people, it was important to consider and deal with them in the right way (an ethical manner). Five fundamental ethical principles guided this research: integrity, professional competence and due care, confidentiality, and professional behaviour (Quinlan, 2011). All of these elements were reflected in this research text and were confirmed by the reader. The application by the researcher of ethical principles and standards started with the identification of constituents, possible harm, and risks, and then responding accordingly.

The first constituent is the DOD who is the object under investigation and whose members contributed towards the research. The DOD is a military organisation and its data and information were dealt with according to military specifications and requirements. Therefore, approval was requested and is attached in Appendix C. Secondly, it is the University of Cape Town under whose auspices the research was done and who has its own ethical clearance processes. As such, the provided guidelines were followed by the researcher to obtain the necessary ethical clearance as illustrated in Appendix D. The third constituent is the FM practitioner who was the respondent of the questionnaire.

The researcher has a duty of care not to harm anyone, and thus, has to identify possible harm and risks that this research poses. Three main ethical issues were considered and implemented in this research: transformation, confidentiality, and anonymity. To negate possible harm the principle of openness and transformation were applied. The researcher presented the research accurately to the participants, who have the right of being informed, and who had the right to volunteer or decline. Respondents were assured of confidentiality and anonymity. Confidentiality guarantees the respondents that their responses are only accessible to the researcher and the study leader. Anonymity ensures that respondents are not identified or identifiable. Respondents gave their informed consent, Appendix A, before they completed the questionnaire.

4.5 Questionnaire design

Ethical considerations guide the design and development of any questionnaire but it is mainly the type of data that the researcher wants to collect, while adhering to the principles of relevance and accuracy, which determines what it would look like. Data is either quantitative or qualitative. Quantitative data is numerical in nature and easy to code and interpret. Qualitative data, amongst others, represents feelings, thoughts, ideas, and understanding, which is non-numeric data which is more difficult to codify and interpret.

According to Bhattacherjee a highly structured questionnaire should leave room for open-ended questions to provide qualitative data with lots of richness, depth, and complexity, and

which is far more descriptive than quantitative data (Bhattacherjee, 2012). Therefore, the questionnaire applied a mix of closed-ended and open-ended questions to get access to both types of data.

In order to ensure that these questions and data collection methods are scientific the principles of relevance and accuracy should be adhered to. Therefore, the following key theoretical issues were considered in the design of the questionnaire:

- content of the questions - what should be asked?;
- construction and presentation of each of the questions - phrasing of questions;
- order or sequence of the questions;
- pre-test and revision; and
- the length of the questionnaire (Quinlan, 2011 : p. 337) (Zikmund, 2003 : p. 330)

There are many sources of content questions for this research: the research objective itself; research propositions, conceptual and theoretical frameworks, questions used in similar research, and issues raised in pilot study interviews. The main focus of questions is the fourth research objective and the relevant propositions. The objective is "to determine the current scope and understanding of FM practices at military unit level" and the five propositions are:

- Facility practitioners understand what FM in the DOD entails;
- Facility practitioners are informed to perform FM;
- Facility practitioners are skilled and competent to perform FM;
- Facility practitioners are trained and educated to perform FM;
- Facility practitioners are empowered to perform FM.

The conceptual and theoretical frameworks created in the first three chapters of this research defined FM, indicated required FM competencies, and identified questions which lowers the level of abstraction of the above research objective and the propositions. Table 10 indicates the research propositions defined in Chapter 1 and the questions that have been raised in the first three chapters, which are relevant to the propositions.

Table 10: Questions raised in conceptual and theoretical frameworks

Proposition	Questions
Facility practitioners understand what FM in the DOD entails.	Define FM Are you aware of a DOD asset register? Are you aware of an immovable asset management plan? Is there irregular spending on FM? Are there properties at military unit level that are underutilised and neglected? Is there a clear FM structure at military unit level? What are the FM roles and responsibilities at military unit level? Are there FM posts, promotional opportunities, training and education? Is there an ability to influence decision-making? What is the level of FM awareness in the unit? Is there a link between objectives and FM decisions and day-to-day activities Is there an FM performance system in the DOD? What does it consist of?
Facility practitioners are informed to perform FM.	Is the asset register up to date for your unit? Buys and Tonono found that FM managers in the public sector are knowledgeable, that some are inexperienced, that information management systems are not used extensively, and that the poor condition of state property is not only due to inappropriate funding but also to a lack of properly trained FM managers Do Mil FM practitioners know relevant documents? IS FM a profession in DOD? At military unit level? Endowment or heritage property in the unit?
Facility practitioners are skilled and competent to perform FM.	Are personnel competent with adequate skills to verify, capture and correct property data in an effective asset register? Do Mil FM practitioners know relevant documents? Endowment or heritage property in the unit? Size of units' property portfolio? Buildings? Do you think integration lead to better use of resources? Effectiveness?
Facility practitioners are trained and educated to perform FM.	Do Mil FM practitioners know relevant documents? Endowment or heritage property in the unit?
Facility practitioners are empowered to perform FM.	Is there a clear FM structure at military unit level? What are the FM roles and responsibilities at military unit level? Are there FM posts, promotional opportunities, training and education? Are budgets sufficient? What is the level of importance of FM? Is there an ability to influence decision-making? What is the level of FM awareness in the unit? Do Military FM practitioners know the relevant documents?

The conceptual and theoretical frameworks also highlighted findings of previous research and statements made by the DOD that could be used as questions to determine the scope and understanding of FM at military unit level. Some of the research findings were:

- isolation may occur in case of FM function separation;
- time and effort conflict can occur when FM activities are integrated;

- proper FM requires the necessary resources;
- all relevant personnel, at all levels, needs training;
- documentation to be important;
- buildings older than five years mostly did not have documentation;
- maintenance constraints are listed as due to a lack of training and transport, insufficient funding, poor top management support, limited skilled personnel, unavailability of parts, and the absence of manuals and drawings;
- with regard to budget estimation 26% used the previous year's budget, 45% was based on current year requirements/needs, and 23% used information from the repair/history cost file. The difference between proposed budget and approved budget over the last five years varied between 0 and 20 percent for 66% of respondents;
- FM was not implemented as prescribed in the literature (Lazarus and Hauptfleisch, 2010); and
- the importance of issues such as: land reform; the acquisition, utilisation, maintenance and disposal of land and facilities; environmental management; and the promotion of private and public sector maximisation of scarce resources.

Some of the statements made by DOD with regard to FM are:

- The DOD Enterprise Risk Management and Mitigation for 2015/16 identified deteriorating DOD facilities and infrastructure as a risk that has morale implications.
- The DOD has a constitutional obligation to assist with the reform and the restitution of land.
- A change in force structure requires a change in Defence facilities requirement.
- There is a need for sound FM and EM principles to improve on effectiveness and efficiency.
- Execute the function shift from NDPW to Defence Works Formation (DWF).
- Develop an Internal Works Capability with the mandate to provide the DOD with an in-house capability for portfolio management, including: FM encompassing facility life cycle management, maintenance and repair, military integrated environmental management and work skills development. This should be done in line with health and safety requirements.
- A nation-wide condition assessment programme.
- A programme to comply with GIAMA requirements.
- A project of migrating the function of life cycle management and custodianship of state-owned property from NDPW to DOD.

- The Defence Estate Strategy prescribes the total life cycle management of all defence estate from planning stage to disposal stage.

After careful consideration of the above-mentioned questions and statements, and the questionnaires used in the research of Buys and Tonono (2007) (Eastern Cape public sector FM), Yusof (2013) (Public sector asset management in Malaysia), Buys and Mavasa (2007) (the management of government immovable assets), and Dlamini (2009) (GIAMA implementation), a questionnaire was developed that consists of 23 main questions. The aim of the questions was to provide answers to the following questions: What guides FM and FM manager at military unit level? What is FM in the DOD? How is FM structured in the DOD, and in military units? What capabilities/competencies are required of an FM manager at military unit level? What resource and capacity development, and career opportunities exist? The type and role of each question asked is illustrated in Table 11. The questionnaire is attached as Appendix B.

Table 11: Questions, type and role

1	**What is your post within the unit FM environment?**	Open-ended. To differentiate the type of respondent. Use it for group comparisons.
2	**How much of your time do you spend on the following FM levels?**	Closed-ended. Select level. To determine respondent's perception of his role and to determine how important strategic FM is in the unit. (*Scope and understanding)*.
3	**How long have you been employed in your current post?**	Closed-ended. To determine experience. Use for comparisons.
4	**What was your previous mustering/corps?**	Open-ended. To determine background, experience, and how it will influence other responses.
5	**What is your actual mustering/corps?**	Open-ended. To determine appointment criteria, importance of FM in the DOD, and influence on other responses.
6	**How many personnel do you have in your department / division?**	Open-ended. To get an idea of work load and how it will influence other responses.
7	**What professional training have you undergone in Facilities Management (FM) or Environmental Management (EM)?**	Closed-ended. To get an idea of qualifications and then determine the relationship with responses to other questions.
8	**How many years' experience in Facilities Management (FM) or Environmental Management (EM) do you have?**	Pivot type closed-ended question. Firstly to determine if knowledgeable enough, and secondly, to see how it affects other answers.

9	**Do you have a professional membership status for FM (FM) or Environmental Management (EM)?**	Closed-ended with option to indicate membership status. Firstly, to indicate of DOD appoints qualified personnel, and secondly to clarify other responses.
10	**To which age group do you belong?**	Pivot type closed-ended question. To see if age affects certain responses. Use as group.
11	**What is the size of your units' property?**	Closed-ended. To determine how informed respondent is, and to correlate with activities.
12	**How many buildings are there in your units' property portfolio?**	Closed-ended. To determine how informed respondent is, and to correlate with activities.
13	**How many buildings are not used/vacant?**	Closed-ended. To determine how informed respondent is?
14	**What part of the units' budget is allocated to FM?**	Closed-ended. To determine how informed respondent is, to determine figure allocated to FM, and to correlate with question 20.
15	**What portion of FM budgeted for was received in the current year?**	Closed-ended. To determine how informed respondent is. To gain insight on the budget itself and to correlate with question 20.
16	**To what extent do you agree with the following facilities management statements:**	Closed-ended 5-point Likert scale that measures the direction and degree of agreement with certain FM definitions, research findings, and DOD statements.
17	**Acts, policies and documents used for FM**	6-point Likert scale that questions what documents are used and how often it is used. Response will indicate relevance and/or how informed FM practitioner is.
18	**Activities and tasks**	6-point Likert scale that enquires about activities and tasks (*scope)*. Responses will indicate the DOD FM tasks and competencies at military unit level. BIFM competencies
19	**Use of Information Technology Systems**	6-point Likert scale that questions the use of IT systems.
20	**FM in my unit is the …**	Open-ended question to determine the understanding at that specific unit of FM. Qualitative
21	**The three major problems that face facility managers in units are:**	Open-ended question to determine what the barriers are to effective and efficient FM at military unit level. Are budgets, training, empowerment mentioned? (understanding, informed, and empowerment?*)* Qualitative
22	**The problems in section 21 can be solved by:**	Open-ended question to determine what the solutions are for effective and efficient FM at military unit level. Are budgets, training, empowerment mentioned? (understand, and informed?) Qualitative
23	**The three main benefits of FM at military unit level are:**	Open-ended question to identify the benefits of FM at military unit level? (understand?*)* Qualitative

Table 11 also gives some indication as to how questions were phrased. There are many ways to phrase a question and relevant examples were found in the four questionnaires considered. As a result open-ended, closed-ended (fixed-alternative), checklist (multiple answers), and attitude rating questions (Likert scale) were included (Zikmund, 2003).

Taking into account the possible needs, interests and problems faced by FM practitioners the questions were phrased as simple as possible, using simple military related wording, and conversational language. Upon completion of the questionnaire care was taken to confirm that questions are not leading, loaded, ambiguous, double-barrelled, or based on assumptions.

The questionnaire was kept as short as possible using the type of questions mentioned earlier that motivate a response rather than tire the respondent. The questionnaire followed an approach similar to the researched questionnaires starting with general information (open-ended) before turning to more detail on the scope and understanding of FM (closed-ended). This funnel-type approach is also good to address order bias.

Order bias is a risk in questionnaire design where respondents are influenced by earlier questions and options (anchoring) (Zikmund, 2003). Ideally, the order of questions should be randomised but that is not possible with drop and collect questionnaires. Questions 8 and 10, on years' experience and age, are pivot type questions that might speed up responses. Question 18 presented three further risks. Firstly, the respondent might want to impress, and secondly, the answers may all be in the same direction. To ensure veracity in answers and honesty very similar options were repeated at different intervals. The third risk was contextual in nature with respondents having a different idea to the meaning of the concepts used as tasks and activities. These risks and developmental issues can be addressed with a pre-test.

Given the small size of the population of this research, a pre-test was essential and yet difficult to perform. It was, therefore, decided to complete the questionnaire at the Military Academy first before it is applied in the other units. The questionnaire was completed when

respondents agreed to be part of this research and how they will be treated. As such, potential respondents were provided with a description of the research, time frames, and confidentiality.

The accuracy or quality of this research design was determined by the internal validity, external validity, construct validity, and reliability.

4.6 Validity and Reliability

Social research is valid if it measures what it is supposed to measure, and it is reliable if it can be repeated with the same consistency in results (Quinlan, 2011). Various measures were undertaken in this research to ensure construct validity, internal validity, external validity, and reliability of the case study and the mixed-methods used.

Construct validity or confirmability questions the extent to which the research investigates what it claims to investigate. To ensure construct validity, use was made of a single case exploratory design, and multiple (triangulation) sources of evidence and processes of information collection such as FM documents, interviews, and a questionnaire that produced quantitative and qualitative data. Experts in public FM, research methodology, and statistics were consulted in the construction of the questionnaire. Links were established between research propositions and the questions of the questionnaire as illustrated in Table 10.

Internal validity, or credibility, indicates if the correct conclusions are drawn and is ensured by making use of a conceptual framework that was created in Chapter 2 and 3, previous FM research in Chapter 3, and a case study that changed from being exploratory to explanatory. To increase the internal validity use were made of quantitative and qualitative techniques, factual questions, mechanical recording of data, and detail reporting of data analysis. The research process was peer reviewed and some participants were included in the process from start to finish.

External validity deals with the applicability, generalisation or transferability of the findings to other units and according to Tellis (1997) is difficult to achieve in a single case study. Yin

(1994), according to Tellis (1997), indicated that external validity can be achieved from theoretical relationships, and therefore, the following techniques were applied. Firstly, although it is a single case study, a replication logic is used in four different units. Secondly, all information consulted is maintained and accessible.

Reliability of data and findings deals with consistency and dependability of results. To ensure that the case results are reliable a full account is given of existing theories and ideas, the focus of the study, the scope of the research, and the environment in which data was gathered. This case study is reliable because the research questions are clear and the features of the study design matches the research questions. The second aspect of reliability is the internal consistency of the items measuring the underlying attribute. Cronbach's alpha was used to determine the average correlation among the items that make up the scale. A Cronbach Alpha coefficient of $\alpha = .851$ was obtained for the FM activities and tasks, and $\alpha = .816$ for the use of acts, policies and regulations which are both considered acceptable.

4.7 Data analysis, presentation and interpretation

Data processing and analysis is the fifth stage of the research process as illustrated in Figure 9. Both quantitative and qualitative data were processed and analysed to determine the scope and understanding of FM at military unit level. Collecting, analysing and integrating quantitative and qualitative data is a mixed-methods approach to conducting research as illustrated in the research of Molloy (2012). Creswell (2008) indicated that a mixed-method could either be a method or methodology for conducting research. The benefit of using mixed-method research is that using both qualitative and quantitative research leads to better understanding of the phenomenon or issue (Creswell, 2008). Qualitative data can be used to compare or explain quantitative data.

The difficulty of using both is according to Quinlan (2011: p. 433) that it is based on: "different philosophical foundations and different epistemological and ontological assumptions". Quinlan (2011) also advises that quantitative data is dealt with objectively and qualitative data subjectively.

Quantitative data are summarised and rearranged in Chapter 5 to provide useful information once it is edited and coded. Data is edited, in the fourth stage, to ensure legibility and consistency, and to make sure that there are no omissions. Thereafter, a numerical score is allocated to each answer that has not already been coded in the questionnaire (pre-coded). Once coded the data will be entered on SPSS for analysis. According to Quinlan data analysis can be completed in four stages:

- The first stage deals with a descriptive analysis that describes the data.
- The second stage interprets the data by means of explaining the meaning of the data.
- The third stage draws conclusions from the interpretation in stage two.
- The last stage creates theories or comparisons to existing theories. (Quinlan, 2011 : p. 408-409)

The unit of measurement used in quantitative analysis is called a variable (Quinlan, 2011). Variables can be measured, controlled, or manipulated depending on the type of variable: nominal, ordinal, interval, or ratio. Nominal variables such as mustering, position, and professional status are just labels, and can therefore, not be ranked. The question about age allows for various categories, and is, therefore nominal. Ordinal scales are intermediate levels of measurement consisting of a scale of values (order) where the distance between values on the scale cannot be measured. What is difference (distance) between weekly and daily, or between strongly disagree and disagree? Question 16 illustrates the use of ordinal scales where the respondent has to indicate the extent of agreement with certain FM statements. Ordinal scales apply to questions 17-19.

Interval level scales such as degrees Celsius, are distributed in an even continuous manner with measurable distances between values (interval) which makes it partially acceptable for statistical analysis. However, these scales have no zero value, and therefore, are limiting statistical analysis. Ratio scales are applied in questions 11-15. Ratio scales indicate an order, the distance between values and have a zero value. These scales are ideal for statistical calculations.

Quantitative data can be analysed using one variable (univariate analysis), two (bivariate analysis), or more than two variables depending on the size of the sample (multivariate analysis) (Quinlan, 2011). Single variable analysis results in a descriptive analysis.

Descriptive analysis entails the summary and transformation of raw data so that it can be understood and interpreted (Zikmund, 2003). The most common way of summarising data is by means of central tendency such as mean, median, and mode. The mean is used in Chapter 5 to indicate the central tendency or average responses. Data can also be described using measures of dispersion, frequency distributions and percentage distributions and all of this information can be tabulated in a table or other summary format. Standard deviation, the square root of the variance, is used in Chapter 5 to indicate the distribution of the responses from the mean.

Bivariate analysis is a more elaborate analysis also referred to as cross tabulation. As the name suggests cross tabulation is the process of comparing different subgroups, categories, or classes. Cross tabulation also allows the researcher to determine the form of relationship between two variables. Statistical analysis such as one-way ANOVA, t-tests, correlation tests and simple linear regression can be applied in a bivariate analysis (Quinlan, 2011). A one-way ANOVA is used in this research to determine if the difference in means of different groups within the FM environment is significant. Groups are created based on a specific attribute and the means then compared.

The data used for such analysis can be nominal, ordinal or interval as explained earlier. This research made use of some of the following variables for a bivariate analysis: military units, age groups, experienced and inexperienced practitioners, levels of operation, and property portfolio sizes.

Multivariate analysis of more than two variables could be according to multiple regression analysis and MANOVA (Quinlan, 2011). Ultimately, this research tested the propositions that were stated in Chapter 1.

- Facility practitioners understand what FM in the DOD entails;

- Facility practitioners are informed to perform FM;
- Facility practitioners are skilled and competent to perform FM;
- Facility practitioners are trained and educated to perform FM;
- Facility practitioners are empowered to perform FM.

The above-mentioned propositions were only rejected if the relationship between variables are due to chance, and as such, are not significant. Therefore, for the relationship to be significant (α value of = 0.05) there should be less than 5% chance (probability) of it being rejected. The significance value is the maximum acceptable risk (probability due to chance) (Bhattacherjee, 2012).

Qualitative data will also be collected from the questionnaires. The last four questions dealt with FM definitions, problems, solutions and benefits at military unit level and the responses are qualitative in nature. Responses were listed and these lists were collapsed in a process of abstraction into concepts which are short and manageable (Quinlan, 2011). These concepts or themes were then used to elaborate on quantitative findings and results.

As indicated earlier qualitative data is analysed in a more subjective manner with the researcher becoming more involved than in the case of quantitative analysis (Quinlan, 2011). Combining quantitative and qualitative research results ensures complementarity to elaborate, enhance, and clarify results. As such, cognisance should be taken of how results are interpreted, presented and concluded.

The sixth and final stage of the research process is to draw conclusions and prepare a report. The presentation of quantitative and qualitative data can be done separately or together (Quinlan, 2011). This research report on the research problem: *The current scope and understanding of FM at military unit level on the West Coast is disjointed,* and the research aim, which is *to explore FM practice at military unit level; to compare it to policy and guidelines, and subsequently, to present a coherent picture of FM at military unit level*. In Chapter 5 quantitative and qualitative results are reported together as findings of the research propositions.

4.8 Conclusion

The previous chapters have identified a lack of a formal FM structure, guidelines for the roles and responsibilities of FM practitioners, resource and capacity development, or career opportunities in the DOD. Therefore, a need arose to identify the scope and understanding of FM at military unit level. In this chapter a six-stage process was followed that identified the research process, methodology, and design and highlighted the design of a questionnaire, and how the data were analysed, presented and interpreted. The validity and reliability of the questionnaire was also determined.

This research is social in nature – it is studying an aspect of the social world. It is based on the interpretivist paradigm which is subjective in nature in forming theory through a process of induction. Because this is a new area of research with a need to determine the dimensions of the phenomena it will be exploratory. Although there are various methodologies, a single case study methodology is ideal for a bounded entity such as a military unit. The case study methodology allowed for an in-depth detailed instrumental study of FM in the military unit.

The research design or comprehensive plan for data collection is determined by various issues, and therefore, a multi-method approach will be followed studying secondary data and collecting primary data. Secondary data was studied in the literature review, and the primary data will be collected by means of a questionnaire. The collection of data were guided within five ethical principles to ultimately ensure that no one is harmed in this research.

The design of the questionnaire was based on previous research questionnaires, secondary data, and the research objective and propositions. Twenty three questions were developed consisting of both open-ended (qualitative data) and closed-ended (quantitative data) questions, keeping in mind the need for validity and reliability.

Quantitative and qualitative data are collected, edited, coded and analysed as mixed-methods research to ensure elaboration, enhancement and clarification of the understanding and scope of FM at military unit level. Findings on quantitative data were summarised by means of descriptive and bivariate analysis. The qualitative data was linked to themes,

subjectively analysed, and presented in a narrative with quantitative results to address research propositions. Generalisation of findings in Chapter 6 was limited by the size and geographical position of military units.

CHAPTER 5: ANALYSIS OF DATA

5.1 Introduction

In the previous chapter the research process, methodology and design were discussed which highlighted the design of a questionnaire, and how the data was analysed, presented and interpreted. Furthermore, the chapter also contextualised the research design by listing various delimitations and limitations. The research process was developed to address the research aim, research propositions, and the research objectives.

The research aim is to explore current FM practice and understanding at military unit level; to compare it to policy and guidelines; and subsequently, to present a coherent picture of FM at military unit level. The research propositions suggest that FM practitioners understand FM; are informed; are skilled and competent; are trained and educated, and are empowered to perform FM. The research propositions are tested as part of the fourth research objective, which is to determine the scope and understanding of FM at military unit level.

In this chapter the scope and understanding of FM primary data, collected by means of a questionnaire, are presented. The presentation consist of a descriptive analysis of quantitative data, and an interpretation of the qualitative data.

5.2 Research findings and data analysis

The quantitative and qualitative research findings are discussed in conjunction with the research propositions: structure, understanding of FM, and the competence of FM practitioners at military unit level. Competency was determined in assessing how informed, skilled, trained, experienced, and empowered FM practitioners are, and the scope of what they do. As in sequential mixed-methods, research findings are based mainly on quantitative data and qualitative data and is used to elaborate, enhance or clarify quantitative data.

In the four military units, there were 12 respondents of which two were Logistics Officers (Logo's), one who was both the facility and the environmental manager, two asset managers, two environmental managers, one facility manager, and four with subordinate delegations. Hence, the use of the term facility management practitioners. The group of FM practitioners was divided into four groups: *logistic officers*, *facility and asset managers*, *environmental managers*, and *others*. It would have been ideal to split the group into officers and non-commissioned officers because of the traditional role differences but in some units the supposed role of officers are performed by Warrant Officers (non-commissioned). There were five officers, six non-commissioned officers and one civilian, and most (6 or 50%) of these FM practitioners fell within the 40-49 years age category. These respondents were asked to indicate the current organisational structures within their units with specific reference to FM.

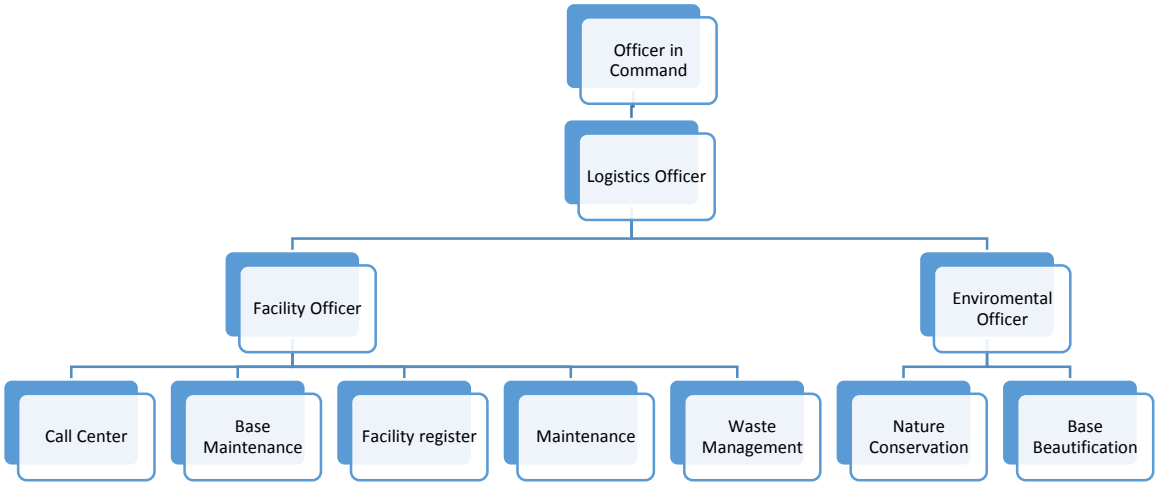

Figure 8: Unit FM structure

The structures of the four units were found to be very similar and is summarised in Figure 8. This structure indicates that FM at military unit level is a logistics function that resides under the Logistics Officer who reports to the Commanding Officer of the unit. An Environmental Officer (Manager) is appointed parallel to the Facility Officer (Manager). Subordinate to the Facility Officer are the functions of call centre, base maintenance, facility register, maintenance and waste management. Nature conservation and base beautification are delegated to the Environmental Officer.

It is important to note that this illustration is a summary of the current structures employed by the four units. No two units have the same organisational structure and none of the FM environments were fully staffed. Table 12 indicates the property size, number of buildings, FM personnel, and the existence of facility and environmental officers. Where there was more than one response per unit it was not clear that all FM practitioners agreed on the size of the properties or the number of buildings of the unit.

Table 12: Unit Property Scope

	Unit A	Unit B	Unit C	Unit D
Size*	1600ha	20ha	Not sure	3.65ha
Buildings*	402	13	535	230
FM Personnel	6	1	9	4
Facility Officer	Yes	No	Yes	Yes
Environmental Officer	Yes	No	Yes	Yes

The understanding of FM was addressed from the perspective of the four groups as alluded earlier on. Understanding of FM is explored using various FM definitions, DOD FM statements, and FM practitioners own defined definitions, risks, solutions, and benefits. Respondents had to indicate their level of agreement with the definitions and statements on a 5-point Likert scale: strongly disagree=1, disagree=2, not sure=3, agree=4, and strongly agree=5. Table 13 indicates the descriptive findings of the understanding of various FM definitions by the different groups.

Four different definitions and a distinction were posed to the FM practitioners from the four different units:

- Definition A: FM is the management of buildings and their related services.
- Definition B: FM is the total management of all services that support core-business.
- Definition C: FM is the practice of integrating people, business process and physical infrastructure.
- Definition D: FM is the management of only cleaning and gardening services.
- Distinction: Property management, facilities management and asset management are the same.

Table 13: FM definition descriptive statistics

	N	Min	Max	Mean	Std. Deviation
FM Definition A	12	4	5	4.75	.452
FM Definition B	12	1	5	3.83	1.403
FM Definition C	12	3	5	4.42	.669
FM Definition D	12	1	2	1.25	.452
Distinction	12	1	5	2.17	1.467

As can be seen in Table 13 the respondents strongly agreed with the definitions that referred to buildings (definition A) or physical infrastructure (definition C) with very little deviation. They also disagreed strongly with definition D. However, they were not as unified in their assessment of definition B or if a distinction exists between property, asset and FM. Although respondents indicated that property, facility and asset management are not the same (2.17) a standard deviation of 1.467 was identified. To determine if the difference to the mean is significant a One-way ANOVA was determined which is illustrated in Table 14.

Table 14: ANOVA of FM definitions

		Sum of Squares	df	Mean Square	F	Sig.
FM Definition A	Between Groups	.750	3	.250	1.333	.330
	Within Groups	1.500	8	.188		
	Total	2.250	11			
FM Definition B	Between Groups	15.417	3	5.139	6.578	.015
	Within Groups	6.250	8	.781		
	Total	21.667	11			
FM Definition C	Between Groups	2.167	3	.722	2.101	.178
	Within Groups	2.750	8	.344		
	Total	4.917	11			
FM Definition D	Between Groups	.250	3	.083	.333	.802
	Within Groups	2.000	8	.250		
	Total	2.250	11			
Distinction	Between Groups	6.417	3	2.139	.992	.444
	Within Groups	17.250	8	2.156		
	Total	23.667	11			

Table 14 illustrates that the Sigma for the distinction between property, asset, or FM is not significant but that there is a statistically significant difference between the means of the different groups for definition B. The Sigma for definition B is smaller than 0.05 which makes it a statistically significant difference. Therefore, the groups are not in agreement on definition B. A post hoc test could be run to indicate which groups differed. The test used is Tukey's honestly significant difference (HSD) post hoc test, and the statistically significant mean differences are illustrated in Table 15.

Table 15: Post Hoc definition test – Tukey HSD

Dependent Variable: FM Definition B					95% Confidence Interval	
(I) Current Appointment	(J) Current Appointment	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Facility Manager	Environmental Manager	2.250	.765	.072	-.20	4.70
	Other	-.750	.625	.644	-2.75	1.25
	Log Officer	-1.250	.765	.414	-3.70	1.20
Environmental Manager	Facility Manager	-2.250	.765	.072	-4.70	.20
	Other	-3.000*	.765	.019	-5.45	-.55
	Log Officer	-3.500*	.884	.018	-6.33	-.67
Other	Facility Manager	.750	.625	.644	-1.25	2.75
	Environmental Manager	3.000*	.765	.019	.55	5.45
	Log Officer	-.500	.765	.912	-2.95	1.95
Log Officer	Facility Manager	1.250	.765	.414	-1.20	3.70
	Environmental Manager	3.500*	.884	.018	.67	6.33
	Other	.500	.765	.912	-1.95	2.95

*. The mean difference is significant at the 0.05 level.

There are three tell-tale signs for indicating which groups have a significant difference. Firstly, the mean difference (I-J), is bigger than the mean differences with other groups, as highlighted with the asterisks. Secondly, Sigma (Sig.) is less than 0.05, and thirdly, there is no zero value between lower bound and higher bound. As a result, it was found that *Environmental managers* had a different view of definition B compared to *Log officers* and *others*.

The difference in opinion on definition B is further emphasised in Table 16, which illustrates the means and standard deviation for each of the groups per definition. The two *environmental managers* in unison declared that they disagree with the statement that FM is the "total management of all services that support core business". The other three groups were in agreement with the definition.

Table 16: FM definition descriptives per current appointment

Current Appointment		N	Min	Max	Mean	Std. Deviation
Facility Manager	FM Definition A	4	5	5	5.00	.000
	FM Definition B	4	2	5	3.75	1.258
	FM Definition C	4	4	5	4.75	.500
	FM Definition D	4	1	2	1.25	.500
	Distinction	4	1	5	3.00	1.826
	Valid N (listwise)	4				
Environmental Manager	FM Definition A	2	4	5	4.50	.707
	FM Definition B	2	1	2	1.50	.707
	FM Definition C	2	4	4	4.00	.000
	FM Definition D	2	1	2	1.50	.707
	Distinction	2	1	2	1.50	.707
	Valid N (listwise)	2				
Other	FM Definition A	4	4	5	4.50	.577
	FM Definition B	4	4	5	4.50	.577
	FM Definition C	4	3	5	4.00	.816
	FM Definition D	4	1	2	1.25	.500
	Distinction	4	1	4	2.25	1.500
	Valid N (listwise)	4				
Log Officer	FM Definition A	2	5	5	5.00	.000
	FM Definition B	2	5	5	5.00	.000
	FM Definition C	2	5	5	5.00	.000
	FM Definition D	2	1	1	1.00	.000
	Distinction	2	1	1	1.00	.000
	Valid N (listwise)	2				

From Table 16 it is also clear that *facility managers* and *logistic officers* strongly agree that FM is the management of buildings and their related services. Interestingly *environmental*

managers and *others* do not agree to the same degree. Furthermore, all the groups agree that FM "is a practice of integrating people, business process and physical infrastructure" (definition C) and that it is not only a cleaning and gardening service (definition D). With regard to whether property, facility, and asset management are the same *facility managers* and *other* were not sure but *Logistic Officers* and *environmental managers* were quite sure that it is different.

Respondents were also asked to what extent they agreed with DOD published statements, general FM statements, and FM career and development opportunities in the DOD. The first three statements in Table 17 were made in the DODI and all FM practitioners, as subordinates, should be aware of this and execute accordingly. The fourth and fifth statements are more general in nature trying to measure the understanding and experience of FM practitioners at military unit level. The last two statements measure awareness (understanding) of DOD training and career opportunities.

Table 17: Descriptives on DOD statements

	N	Min	Max	Mean	Std. Deviation
The DOD has a constitutional obligation to assist with the reform and the restitution of land.	12	1	5	3.42	1.240
Deteriorating DOD facilities and infrastructure is a risk that has morale implications.	12	3	5	4.83	.577
A change in force structure requires a change in the Defence facilities requirement.	12	3	5	4.17	.835
Lack of knowledge of facilities management results in poor performance of state properties.	12	1	5	4.25	1.138
Funding availability is the only causal of state properties decay.	12	1	5	2.67	1.435
There are many DOD career opportunities in facilities management	12	1	5	3.17	1.115
There are FM learning opportunities within the DOD	12	2	5	3.50	.905
Valid N (listwise)	12				

The mean (3.42) for the first statement is close to 3 (unsure), which is of concern. Are they unsure of this being DOD responsibility or are they in a personal capacity not in agreement? Furthermore, the One-way ANOVA and Tukey's HSD indicates no statistically different means for the groups, which suggest that all groups feel the same. With regard to the second and third statement the high mean, small range and low standard deviation suggests strong agreement with the statements, and unison agreement as a group.

Respondents strongly agreed (min=1, max=5, mean=4.25) that a lack of FM knowledge leads to poor performance of state properties. Therefore, the importance of FM knowledge is expressed as well as the relationship between knowledge and facility performance. This finding is further supported by the results for the next statement where respondents mostly indicated that the unavailability of budgets (min=1, max=5, mean=2.67) is not the only cause of poor performance of state properties. However, there is a big difference in responses as indicated by the minimum and maximum values. Therefore, some respondents feel that budgets are the only contributing factor while others feel the opposite. Does this point to a lack of understanding of the factors that contribute to FM performance or is this a case of the perfect FM setup just lacking funds? This question is clarified later on with the results of the open-ended questions, which will be addressed as part of the issue of empowerment.

The last two statements questioned career and training opportunities for FM practitioners within the DOD. The relatively average mean (mean=3.17 and 3.5, standard deviation = 1.115 and .905) suggests that respondents believe that there are learning and career opportunities but are relatively unsure about them. This could be because they are not well informed or that availability is relatively limited compared to other training and career opportunities.

Qualitative results

In order to complete the assessment of what the understanding is of FM at military unit level a qualitative analysis was followed using open-ended questions. Respondents were asked to define FM, and to list problems, solutions and benefits of FM at their units. Themes were then

identified within these responses to be used to elaborate, enhance or clarify the quantitative findings. FM practitioners defined FM within their units as follows:

- "Daily upkeep of buildings and facilities - maintenance and repair"
- "Maintenance of all fixed buildings, temporary structures, road maintenance, sport facilities, machinery (galley equipment), sewerage works, (and) electrical supply…"
- "Maintenance and repairs of all fixed structures, machinery, roadways, water supplies, sewerage systems and electrical infrastructure."
- "Repair of buildings by making use of electricians and plumbers."
- "Upkeep maintenance and beautification of the units' infrastructure."
- "Function to keep all facilities in a safe and operational condition by performing preventative, corrective and planned maintenance activities."
- "integration of processes used by … to maintain and develop services which support the members of the base."
- "..most important asset in allowing the … to fulfil its mandate. As it concerns all enabling infrastructure and resources."
- "…control and maintenance of fixed assets by means of a management system for upgrading and maintenance and repairs."

From these definitions the following themes are identified:

- Preventative, corrective and planned maintenance and repair;
- Control and integration of processes; and
- Beautification, safety and operational requirements.

What is clear from these definitions is, firstly, that no single definition is the same, which could suggest that the focus or aim differs amongst the various FM practitioners. This result correlates with the quantitative findings on the distinction between property management, FM and asset management.

Having said that, the second observation made is that a lot of emphasis is placed on maintenance and repair, which are linked to operational activities on fixed assets and buildings. The quantitative findings indicated that the definitions that included the terms buildings and physical infrastructure received more positive responses than the ones that referred to services that support core-business. In other words, this could mean that they focus more on the hard issues and less on the strategic issues.

There is a lack of reference to strategic orientation, life cycle, processes, and outcomes in the definitions. As the themes suggest beautification, safety and operational requirements seems to be the reason for FM at military unit level. Does this mean that FM practitioners are ill informed, "un-academic" or just not bothered? Well most probably the latter two when one considers the FM benefits listed by the respondents:

- Maintain condition;
- Save money and time;
- Working infrastructure;
- Conducive buildings and facilities;
- Positive and professional image of the DOD;
- Safe and effective work environment;
- High morale;
- Quicker response;
- Sort out emergencies;
- Increased productivity; and
- A decrease in day-to-day expenses.

The themes identified were:

- Saving money and time while increasing productivity;
- Safe and operational environment;
- Improved image of DOD; and
- Improvement in communication and morale.

Considering the benefits listed, it is clear that facility practitioners understand FM and the benefits that it could provide the organisation. Although these benefits are not included in the definitions they still reflect the realities of what is happening at military unit level, and not what FM can or should potentially be. As it will be illustrated in Table 20 the definition provided by practitioners may also be related to the level at which FM practitioners operate. In conclusion the above findings illustrate the understanding of FM by FM practitioners at military unit level. The qualitative results supports the quantitative findings, and the research can now move on to determine how competent FM practitioners are at military unit level.

Competency was determined in assessing how informed and empowered FM practitioners are, and the scope of their work. How informed FM practitioners are, is measured by the

frequency of using acts, policies, and documentation; their actual and previous mustering (jobs); their training and education; and their membership of professional bodies.

Table 18: Descriptive statistics on the use of documentation

	N	Min	Max	Mean	Std. Deviation
Uses GIAMA	10	0	5	1.00	1.700
Uses PFMA	11	0	5	2.82	2.183
Uses DODI	12	0	5	3.00	1.859
Uses LOG Pamphlet	11	0	5	2.36	2.248
Uses SWP	11	0	5	3.82	2.040
Uses UAMP	9	0	3	.56	1.014
Uses ASSETREG	11	0	5	1.91	1.973
Uses NEMA	10	0	5	2.60	2.366
Uses Other Documents	8	0	2	.38	.744
Valid N (listwise)	8				

Respondents were requested to indicate the frequency of their use of different Acts, policies and documents using a 5-point Likert scale: never=0, ad hoc=1, annually=2, monthly=3, weekly=4, or daily=5. On the average the FM practitioners at military unit level use GIAMA, the UAMP and the asset register at most once a year. The minimum value for all documents was zero (0) which indicates that some practitioners never use any of the documents. On average the PFMA, the Log Pamphlet, and National Environmental Management Act (NEMA) are used more than once per year but less than on a monthly basis, and the DODI and Standard Working Procedure (SWP) is being used on a monthly basis as illustrated in Table 18. The mean could be misleading as further distinction of the table suggests. The relatively high standard deviation and the minimum and maximum values of 0=never, and 5=daily require more detailed scrutiny. Hence, it can be concluded that documents are not used often which may suggest that they are not informed and competent, or, is it possible that experience could negate the need for consulting documents?

In order to determine the experience levels of FM practitioners the previous mustering, years of experience in current post (tenure), training/education and professional membership were explored. It was clear from the responses that none of the respondents were facility

practitioners before being appointed in their current post, and only 42% had relevant experience. With regard to experience (tenure) in the current post, Figure 9 illustrates that most of the facility practitioners had less than 5 years' experience; two facility managers had less than 5 years' experience; both environmental managers had less than five years' experience and one of the logistics officers had less than five years' experience. In one of the units, all FM practitioners had less than 5 years' experience. So, if they are not from a FM background, and have limited experience, were they trained or educated to perform the job?

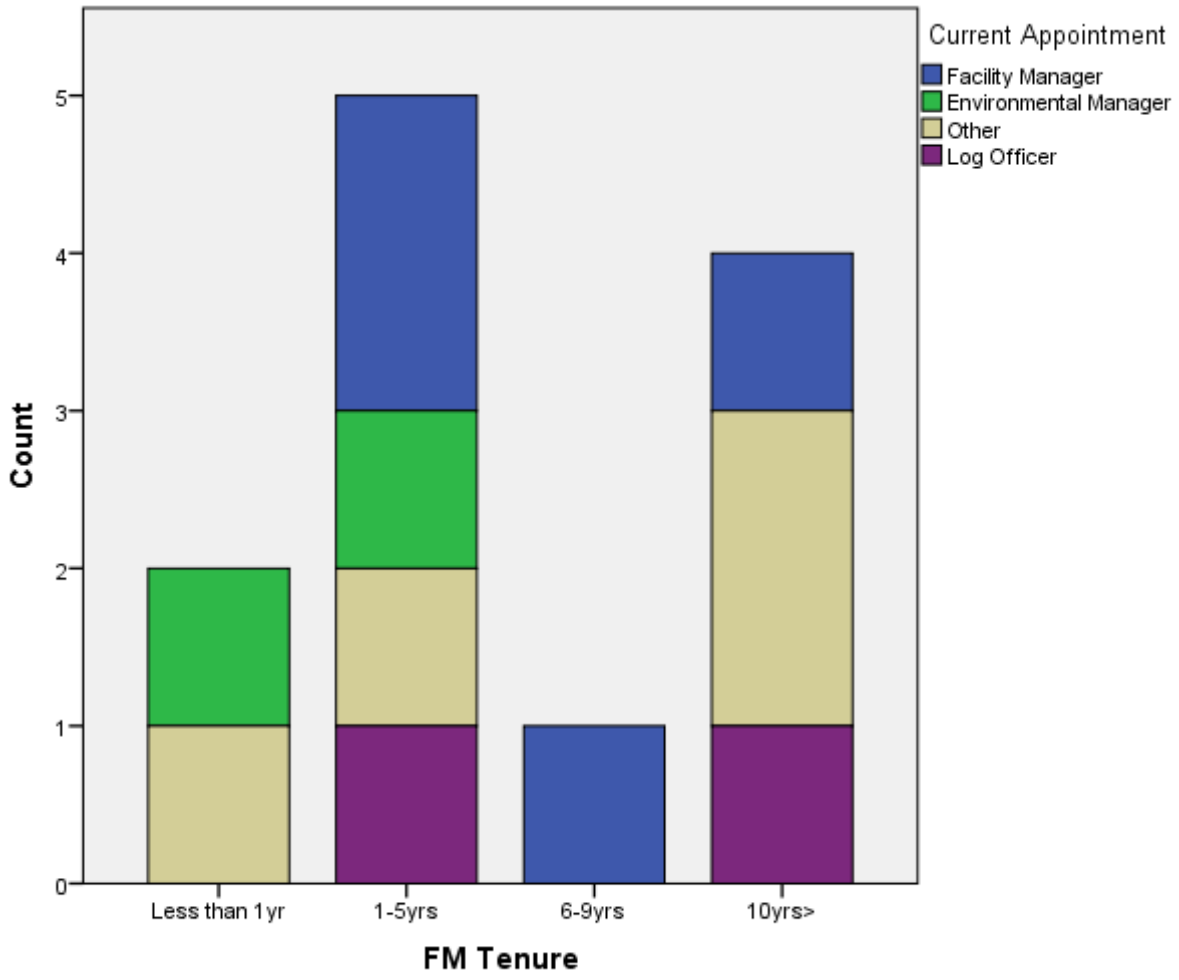

Figure 9: Tenure

With regard to training and education 41.7% of FM practitioners had no FM training or education and 66.7% had no EM training or education as illustrated in Table 19. Of the

seven facility practitioners that came from an irrelevant FM background, four never received any FM training and five did not do any EM training. Of the four facility managers only one had no FM training or education but all four had no EM training or education. The EM practitioners had no FM training but both had more than one EM qualification. With regards to membership of professional FM and EM bodies, none of the FM practitioners are members of either.

Table 19: FM and EM training and education

		FM training/education		EM training/education	
Current Appointment		**Frequency**	**Percent**	**Frequency**	**Percent**
Facility Manager	None	1	25.0	4	100.0
	Military	2	50.0		
	Diploma/Certificate	1	25.0		
	Total	4	100.0	4	100.0
Environmental Manager	None	1	50.0		
	Military				
	More than 1	1	50.0	2	100.0
	Total	2	100.0	2	100.0
Other	None	3	75.0	4	100.0
	Military	1	25.0		
	Total	4	100.0	4	100.0
Log Officer	None			1	50.0
	Military	2	100.0	1	50.0
	Total	2	100.0	2	100.0

The lack of a clear definition, limited previous and current FM experience, minimal training/education, and no professional membership results suggest that FM practitioners are not sufficiently empowered to perform their work as best they can. This conclusion correlates with the findings on career and learning opportunities mentioned earlier. A further illustration of the poor empowerment of practitioners is the use of Information Technology Systems (ITS). Findings indicated that only 25% of practitioners make use of ITS on a daily basis, and 58.3% never uses a computerised maintenance management system. The empowerment or rather the lack thereof, is further illustrated by the open-ended responses to the major issues that facility managers face within military units.

Qualitative results

Respondents had to indicate the three major problems they faced in performing FM or EM in their units. The themes identified were:

- Budgets and funding;
- Staffing, skills and training;
- An inadequate structure, procurement system and limited support;
- Poor communication and reporting systems;
- Poor DPW response and end-user co-operation; and
- Inadequate equipment.

The limited use of documentation as illustrated in Table 18 can be linked to the problems experienced with skills and training. Either the documents do not address the skills or training needed, or because the problem of no training leads to less use of the documents. The need for skills and training correlates with the findings on experience and educational levels.

The following themes were identified as solutions for the problems encountered by the FM practitioners:

- New strategy and structures;
- Resources in the form of people and money;
- Self-accounting status and own budgets; and
- Training.

These responses highlight the frustration that is experienced with different FM structures in the different units, the fact that it is not staffed properly, and the under-allocation of funds as reported in earlier analysis. These qualitative results confirm the quantitative results on budgets, staffing, skills and education.

The empowerment of facility practitioners can also be measured in terms of the job description and the activities that are performed. Therefore, the scope of work and the levels of activity is investigated next.

Table 20: Level of FM activity

Current Appointment		N	Minimum	Maximum	Mean	Std. Deviation
Facility Manager	Strategic Level	4	0	3	1.75	1.500
	Tactical Level	3	0	4	1.67	2.082
	Operational Level	3	3	5	4.33	1.155
	Valid N (listwise)	3				
Environmental Manager	Strategic Level	2	1	3	2.00	1.414
	Tactical Level	2	1	1	1.00	.000
	Operational Level	2	1	1	1.00	.000
	Valid N (listwise)	2				
Other	Strategic Level	4	0	5	2.50	2.082
	Tactical Level	4	0	5	2.00	2.160
	Operational Level	4	2	5	4.25	1.500
	Valid N (listwise)	4				
Log Officer	Strategic Level	2	2	2	2.00	.000
	Tactical Level	2	1	2	1.50	.707
	Operational Level	2	0	4	2.00	2.828
	Valid N (listwise)	2				

Firstly, respondents were asked to indicate time spent in increments of 20% at the strategic, tactical, and operational level. From the results, in Table 20, it is clear that facility and logistics managers spend limited time at strategic level (up to 40% of time), and most of their time on the operational level (up to 100%). The results for the activities *strategic planning* and *strategic advice*, as illustrated in Table 21, support these findings but also suggest that facility practitioners are consulted for advice but are not really involved with planning. As expected, *others* are mostly involved at the operational level.

Table 21 is quite useful as a tool to identify the daily, weekly, monthly and annual activities of the FM role players. Responses ranged from Never = 0, Ad hoc = 1, Annually = 2, Monthly = 3, Weekly = 4, and Daily = 5. The higher the mean the more often the activity is performed. These results could be used to develop job descriptions, measure output, do planning, and identify optimal performances.

If activities are ranked according to the mean scores the main activities of military unit facility managers are: *Emergency Maintenance* (3.92), *DPW Liaison* (3.83), *Health and Safety* (3.83), *Unplanned Maintenance* (3.58), and *H&S Statutory Compliance* (3.58). Limited time was spent on *Horticulture* (1.18), *Asset Performance Assessment* (1.27), *DWF liaison* (1.55), *Strategic Planning* (1.67), and *Complete Asset Register* (1.75).

Table 21: Activity involvement

	N	Min	Max	Mean	Std. Deviation
Strategic planning	12	0	5	1.67	1.435
Budgeting	12	0	5	3.08	2.193
Health and Safety	12	1	5	3.83	1.528
Project Management	12	0	5	2.42	1.832
HRM	12	0	5	3.42	2.353
Strategic advice	12	0	5	3.17	1.850
Security Management	12	0	5	2.83	2.406
Budget Review	12	0	4	2.50	1.732
H&S Statutory Compliance	12	0	5	3.58	1.782
Environmental Management	12	0	5	2.58	2.392
Energy Conservation	12	0	5	2.50	2.316
Security Risk Management	12	0	5	2.92	2.151
Operational Cost Analysis	12	0	5	2.50	1.931
Clean Property	12	0	5	3.17	2.250
Horticulture	11	0	5	1.18	1.991
Complete Asset Register	12	0	5	1.75	1.815
Contract Management	12	0	5	1.92	2.109
Specifications Preparation	12	0	5	1.92	1.832
Requirement Analysis	12	1	5	3.08	1.564
Condition Assessment of Assets	12	0	5	1.58	1.505
Property Data Management	12	0	5	1.58	1.676
Emergency Maintenance	12	1	5	3.92	1.782
Unplanned Maintenance	12	1	5	3.58	1.929
Planned Maintenance	11	0	5	3.18	1.834
Asset Performance Assessment	11	0	5	1.27	1.555
DPW Liaison	12	1	5	3.83	1.528
DWF Liaison	11	0	4	1.55	1.635
Valid N (listwise)	8				

The results in Table 21 suggest that *Strategic planning*, *Horticulture*, *Complete Asset register*, *Contract management*, *Specifications preparation*, *Condition assessment of assets*, *Property data management*, *Asset performance assessment*, and *Liaison with DWF* happens on an ad hoc basis if not annually. Most time is spent on *Budgeting*, *Health and Safety*, *HRM*, *Strategic advice*, *H&S statutory compliance*, *Cleaning property*, doing *Requirement analysis, Emergency-, Unplanned-,* and *Planned maintenance*, and *Liaison with DPW*.

However, the standard deviation for many of these activities is quite high, and therefore, it would be prudent to complete a One way ANOVA to determine if there are significant variances between the different groups: *logistics officers, facility managers, environmental managers,* and *others*. The fact that none of the units are similar in size, structure and staffing should be remembered.

Table 22: One way ANOVA for FM activities

		Sum of Squares	df	Mean Square	F	Sig.
Emergency Maintenance	Between Groups	30.417	3	10.139	18.025	.001
	Within Groups	4.500	8	.563		
	Total	34.917	11			
Unplanned Maintenance	Between Groups	24.417	3	8.139	3.946	.054
	Within Groups	16.500	8	2.063		
	Total	40.917	11			
DPW Liaison	Between Groups	20.167	3	6.722	9.778	.005
	Within Groups	5.500	8	.688		
	Total	25.667	11			

What is clear from Table 22 is that there are significant differences between the mean (time spent) of the different groups for the activities: *Emergency Maintenance*, *Unplanned Maintenance*, and *Liaison with DPW*. Therefore, the descriptive statistics for each group should be considered to determine the activities performed by that group and the amount of time spent per activity. For this research, the activities of facility managers are important and because this task is shared in some units with the logistic officer, it was prudent to list

activities of these two groups. Table 23 illustrates the time spent by Logistic officers (Logo's) and facility managers on the different activities.

Table 23: FM activities of Logo's and Facility Managers

	Logistics Officer		Facility Manager	
	Mean	Std. Deviation	Mean	Std. Deviation
Strategic planning	2.00	.000	.75	.957
Budgeting	1.00	1.414	3.75	2.500
Health and Safety	2.00	1.414	4.75	.500
Project Management	1.00	.000	3.25	2.217
HRM	5.00	.000	2.50	2.887
Strategic advice	2.00	1.414	3.25	2.217
Security Management	2.50	3.536	2.00	2.449
Budget Review	.50	.707	2.75	1.893
H&S Statutory Compliance	2.00	1.414	3.75	2.500
Environmental Management	.00	.000	3.50	2.380
Energy Conservation	.00	.000	2.25	2.062
Security Risk Management	.50	.707	4.50	1.000
Operational Cost Analysis	.50	.707	3.00	2.160
Clean Property	2.00	2.828	3.25	2.363
Horticulture	.00	.000	.67	1.155
Complete Asset Register	.00	.000	3.00	1.826
Contract Management	.50	.707	1.75	2.363
Specifications Preparation	.50	.707	2.50	2.380
Requirement Analysis	2.50	2.121	3.75	1.500
Condition Assessment of Assets	.50	.707	2.25	.957
Property Data Management	.00	.000	2.50	1.291
Emergency Maintenance	2.50	2.121	5.00	.000
Unplanned Maintenance	2.50	2.121	4.00	2.000
Planned Maintenance	1.50	.707	3.50	1.732
Asset Performance Assessment	.50	.707	2.75	1.708
DPW Liaison	2.00	1.414	4.75	.500
DWF Liaison	2.00	1.414	1.75	2.062

The five activities facility managers in military units on the West Coast spent the most time on are: *Emergency maintenance* (5.00), *DPW Liaison* (4.75), *Health and Safety* (4.75), *Security Risk Management* (4.50), and *Unplanned Maintenance* (4.00). Facility managers at military

unit level spent very little time on *Horticulture* (.67), *Strategic planning* (.75), *DWF Liaison* (1.75), and *Contract Management* (1.75). The main activities of Logo's in the facility management environment are: *HRM* (5.00), *Security Management* (2.50), *Unplanned Maintenance* (2.50), *Emergency Maintenance* (2.50), and *Requirement Analysis* (2.50).

What we learn from this table is that Logo's are more involved with *Strategic planning* and *Human resource management* than facility managers which from a unit structure point of view is consistent with the design of the structure. On the other hand, facility managers are more involved in *Health and Safety, Budgeting, Project Management, Strategic Advice, and Requirement Analysis* amongst other things than Logo's. Of interest is the fact that Logo's spend no time on *Environmental management* and *Energy conservation*. Even though these activities can be delegated, the responsibility should not be. With regard to the rest of the activities, the facility manager plays a more active role. The low involvement in horticulture seems significant, but it is most probably due to respondents not being conversant with the term.

A final remark to be made with regard to Table 23 is the std. deviation for some of these activities. Even though it is high for certain activities it should be read within the context of the scope of FM that differs from unit to unit due to its size, staffing, and budget. Therefore, this research did not analyse the difference between units but rather tried to aggregate the understandings and scope of FM.

5.3 Conclusion

In this chapter, the scope and understanding of FM primary data, collected by means of a questionnaire was presented to address the research propositions. The findings were presented by means of descriptive analysis of quantitative data and an interpretation of qualitative data. The qualitative findings were used to elaborate, enhance and clarify the quantitative findings.

Although the units differ in property and personnel size, a standard structure was identified which illustrates the position and reporting lines of FM. Secondly, the competency of FM

practitioners was examined by looking at the use of FM related documentation; previous and current FM experience, FM training and education; and membership of FM and EM bodies. Thirdly, findings were posted on the empowerment of FM practitioners. Lastly, data was tabled to indicate the activities that the different facility practitioners are involved in, as well as the frequency of their involvement.

The qualitative data did not contradict the quantitative data and contributed to a better understanding of the quantitative data. In the next chapter the implications of the findings for FM at military unit level will be discussed.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

In the previous chapter the findings on the scope and understanding of FM at military unit level were presented. These findings were based on quantitative and qualitative data gathered by means of a questionnaire. The data gave insight into FM structures, the competency of FM practitioners, the empowerment of FM practitioners, and the scope and understanding of FM activities at military unit level. In this chapter, conclusions and recommendations are based on the problem statement, the research aim and question with specific reference to the fourth research objective, and the research propositions within the context of the literature review.

6.2 Conclusions

The scene for this research was set by the following statements made about the current condition of assets and facilities within the public sector:

- In the 2012/13 Public Works Annual report Minister Nxesi stated: "when the Register is finalized and will reflect in the national balance sheet more appropriately" (Department of Public Works, 2015 : p. 14).
- Buys and Tonono: maintenance backlog; NDPW is not able to maintain government property (Buys and Tonono, 2007).
- Buys and Mavasa: NDPW is ineffective in asset life cycle management; no…IAM; urgent need for competent personnel with adequate skills to verify, capture and correct property data (Buys and Mavasa, 2007: p. 1).
- Filtane: state property management portfolio was underutilised and neglected (Parliamentary Monitoring Group, 2015).
- Barnard of the DA questioned the quality of data (Kohler Barnard, 2016).
- Only R245,1m (26,8%) of the R914,3m that was handed over to NDPW, was spent on planned maintenance (Department of Defence, 2016).
- The Department of Defence Instruction (DODI): Policy and Planning 00033/2000 identified that the DOD struggled to manage: "service delivery in a significantly cost effective manner", and, "struggled to become results orientated in administration and management processes"(Department of Defence, 2001 : p. 32).

- The DOD admitted that the resources allocated to its supporting functions exceeds resource allocations to similar size organisations; the decentralised structure of control and execution was the cause of it (Department of Defence, 2001).
- The DOD official indicated that DOD properties are in poor condition; that it will take seven to ten years to improve conditions; that there is a shortage of personnel and funds; that GIAMA can be used to motivate for more funds; and that military units handle soft and hard services (Dlamini, 2009).

These statements lead to the formulation of a problem statement that suggests that the current scope and understanding of FM at military unit level on the West Coast is disorganised. In order to determine if this statement is correct, a literature review was conducted in Chapters 2 and 3 on what FM should be, and then in Chapter 5 findings were presented on the scope of FM at military unit level. This is the fourth research objective, which has as its aim to determine the current scope and understanding of FM at military unit level by means of five research propositions.

- Facility practitioners understand what FM in the DOD entails.
- Facility practitioners are informed to perform FM;
- Facility practitioners are skilled and competent to perform FM;
- Facility practitioners are trained and educated to perform FM;
- Facility practitioners are empowered to perform FM.

The understanding of FM is firstly illustrated by the organisational structure employed in the units. There is currently no official document that indicates what the FM structure within the military unit should be. Existing literature, in section 3.6, discussed where the unit fits into the bigger structure, its reporting lines with NDPW and DWF, and the flowcharts that illustrate the different maintenance processes. The DODI of 2000 illustrated a new organisational set-up that addresses the problem of duplication of control and execution functions of decentralised FM. This new structure was developed to create a single point of entry between DOD and DPW at regional and corporate levels; a single structure with no duplication; a single line of communication; integrating immovable asset management and EM; and performance and service delivery agreements. Nowhere was any reference made to the unit and its FM structure, except for a draft document by the Logistics Division in 1998.

The draft, as discussed in section 3.7, suggests that both FM and EM be represented at military unit level. There should be a facilities manager (major) and an environmental manager (major) that forms the Base HQ, and the senior of the two should be the facilities section head. The draft was very clear in stating that these appointments should not get involved in physical execution as it could lead to "mis-utilisation of qualified staff officers" (Logistics Division, 1998 : p. 21). The base execution element would be managed by a Warrant Officer 1 (WO1) who will be responsible for the following functions:

- Accommodation and reporting centre;
- Facilities maintenance;
- Base (Environmental) management;
- Environmental management of training areas and other natural property.

In section 5.2, a summative structure was constructed from the responses received. This structure indicated the FM and the EM managers to be subordinate to the Logistics officer who reports to the Commanding Officer of the unit. Roper and Payant (2014) prefer the FM manager to be at the same level as the managers of HR and IT, which will imply the same level as the Logo. Such a suggestion would make sense if the Logo is obstructing structural changes, staffing and budgeting. However, it could lead to isolation (Jones and White, 2008), and secondly, within the military context FM is a function within the logistics environment, and therefore, the facility manager and the Logo cannot be at the same level. Can the Logistics Officer be the facility manager? This is not advisable as it could lead to conflict in resource allocation and an overload of functions.

The existing FM structure is very similar to the proposed one in the draft document with three minor differences. The actual appointments are a rank level higher than what was proposed in the draft document. Secondly, the activities proposed to be that of a WO1 are currently shared by all involved due to a lack of proper structure and staffing. Thirdly, activities such as base beautification and nature conservation has been added to the FM function.

According to responses, the short term implications for not having a proper FM structure are that many FM functions are not performed, that facilities are in a poor state and deteriorating, and that emergency maintenance increases which erodes budgets. In the long term, the

strategic benefits cannot be realised unless new facilities are invested in. Although the structure is interesting, it does not paint the full picture of FM understanding.

6.2.1 FM practitioners understand what FM in the DOD entails

As indicated by Roper and Payant (2014) both the organisation and facility manager should have a specific philosophy about facilities. Therefore, context was created for this research by making use of a literature review of the definitions that exist internationally and nationally, in the private and public sectors, in textbooks and research papers, and ultimately within the South African public sector and the DOD. At military unit level respondents were given the opportunity to respond to some of the existing definitions, and then to define FM at military unit level. Their responses can now be interpreted and compared to the literature.

Firstly, FM practitioners were all very strongly in agreement that FM is not only about cleaning and gardening. Secondly, they preferred the definition that FM is the management of buildings and their related services. Their second choice was the definition closely related to FMAA's and HKIFM's that defines FM as: the practice of integrating people, business process, and physical infrastructure. As such, it illustrates a partiality for physical structure and maybe a more operational approach to FM.

There was limited consensus that FM is the total management of all services that support core business, and the difference in view was mainly between Environmental Managers, Logo's and Others. The Environmental Managers were in total disagreement with this definition and this might be due to the interpretation of what core business is. If core business is operational readiness, then the management of training will not be an FM activity. The standard deviations that existed within the response to each of these definitions suggest that there may be a disjointed understanding and approach to FM. Therefore, the need to evaluate respondents' own definitions (qualitative data) of FM at military unit level.

The responses indicated no standard definition, and this was both expected and of concern. It is expected mainly because of four reasons. Firstly, the guiding acts such as the National Defence Act, GIAMA, PFMA, Defence Endowment Act, or SA National Heritage Act, or any

other act that guides FM at military unit level does not provide any FM definition. Secondly, the internal DOD FM and EM policies are disjointed which leads to a fluctuation and inconsistency in service delivery (Department of Defence, 2001). Thirdly, the interchangeable use of the terms asset, property, and FM creates confusion and will be discussed later on. Lastly, because of the level at which respondents operate within their units which could influence their working definition of FM.

The concern is that different definitions or a plethora of definitions prevents a common platform (Tay and Ooi, 2001), it leads to confusion (Drion et al., 2012 : p. 257), and the theoretical development of FM. Considering the challenges faced in public FM, a common platform or a common understanding is absolutely necessary.

Although everyone preferred the term management to integration in the provided definitions, none of them included management in their own definitions. They all referred to maintenance and repair which is similar to Jones and White's definition of public property management (see section 2.4). A main theme identified from the definitions is: "preventative, corrective and planned maintenance and repair". The definitions then listed the objects of maintenance and repair as: buildings, facilities, roads, infrastructure, sport facilities, machinery, water supply and sewerage.

The self-defined definitions are operational, or technical in nature as defined by Grimshaw, with no reference to management (GIAMA, Logistics Division draft document), strategic intent (HKIFM), life cycles (SAFMA), processes (BIFM, HKIFM), and outcomes (Facilities Society, HKIFM, DODI). Only one respondent referred to "control and integration of processes" resulting in a narrow view which may be due to cost reduction (budgets), and a self-maintained and restricting supporting role as identified in the research by Drion *et al.* (Drion et al., 2012).

Respondents did not mention any of the outcomes of the transformation document or the DODI: "…to promote the success of core functions...", "…management of impact … on the environment …", "… the delivery of FM support should be such that it enhances or promotes

the successful execution of the core business of the DOD organisation". The main theme identified from the definitions was "beautification, safety and operational needs". Some of these outcomes were mentioned in the benefits of FM that were listed. These benefits not only clarify the respondents' definitions but also illustrate their understanding of FM.

Respondents listed most of the public FM benefits as identified by Jones and White, in section 2.4, and added to the list as noted in section 5.2. More importantly, they provided outcomes for their definitions in listing the following benefits: working infrastructure, conducive buildings and infrastructure, and a safe and effective work environment. Themes identified were: saving money and time while increasing productivity; safe and operational environment; improving image of DOD; and improving communication and morale. However, from an understanding point of view, they failed to identify the benefits of bringing together similar uses, changes in corporate culture, facilitation of corporate change, improved delivery of community objectives, or innovative strategic procurement which confirms that their understanding is at an operational level.

FM practitioners' understanding is formed at the level where and on what they spend most of their time. Section 5.2 illustrated that Facility Managers and Logo's spend most of their time at operational level, and limited time (up to 40%) at strategic level. Although FM practitioners give strategic advice on a monthly basis, strategic planning is done maybe once a year.

The understanding of FM practitioners was further established by probing the extent of their agreement that property, facilities and asset management were one and the same thing. The difference between the three concepts was discussed in sections 2.4 and 3.3, and the findings in section 5.2 suggest that FM practitioners at military units find themselves between *disagree* and *not sure* on this issue with a mean of 2.17 and std. deviation of 1.467. This uncertainty could reflect a poor understanding, being ill informed, or not being trained and educated.

In conclusion the quantitative and the qualitative findings suggest that, similar to the research of Clark and Rees (2000), there is variation in the facility practitioners' understanding of FM.

FM is an ill-defined sphere of activity (Drion *et al*., 2012) at military unit level, and one will have to question, similar to Grimshaw (2003), whether FM practice and conduct at military unit level merits a professional designation. Professional designations require a clear role and scope (Tay and Ooi. 2001), and competency which is addressed in the next three propositions.

6.2.2 FM practitioners at military unit level are informed

As already alluded to, although there is a lot of literature on FM, there is very little information in the relevant acts or DOD documents that define, structure and guide FM at military unit level. As a result, the previous section concluded that each practitioner had their own view of what FM at military unit level is. In this section, conclusions are drawn on how informed FM practitioners are on statements that were published in DOD relevant FM documentation, on learning and career opportunities, as well as how frequent they use FM related documentation.

The first three statements in Table 17 were taken from the DODI (section 3.6) and all FM practitioners, as subordinates, should be familiar of these statements and execute accordingly. The responses received, in section 5.2, were mostly in agreement (mean = 3.42, 4.83, and 4.17) with the statements but can essentially mean two things: FM practitioners are aware of these DOD statements, or it is their personal opinion. This is a failing of this part of the questionnaire but useful conclusions can still be made.

All the groups of FM practitioners felt that they are unsure if the DOD has a constitutional obligation to assist with the reform and restitution of land. Responses also ranged from strongly disagree to strongly agree. The two Logo's had totally opposite views, which could be explained by their age and tenure in their posts. The older, more experienced Logo was in total agreement with the statement which suggests that the younger inexperienced Logo is not as informed. However, the opposite was concluded from the responses of the facility managers. The younger, inexperienced were more in agreement with the statement. The frequency of the use of documentation could not explain this difference, and therefore, it is concluded that personal judgments were made by respondents.

The fourth and fifth statements are more general in nature trying to measure the understanding and experience of FM practitioners at military unit level. The group of facility practitioners agreed that a lack of FM knowledge leads to poor performance of state properties. Facility managers all strongly agreed with this statement but disagreed that funding availability is the only cause of state property decay. The qualitative data supports the quantitative findings with various themes identified as unit FM problems: budgets and funding; staffing, skills and training; an inadequate structure, procurement system and limited support; poor communication and reporting systems; poor DPW response and end-user co-operation; and inadequate equipment. These findings support the research findings of Buys and Tonono (2007) that indicated that the poor condition of state property is not only due to inappropriate funding but also to a lack of properly trained FM managers.

Poor training was identified by one of the respondents as a problem experienced at military unit level, which brings us to the questions on career and training opportunities. Most of the FM practitioners were not sure (mean=3.17 and 3.5, standard deviation = 1.115 and .905) about career and training opportunities in the DOD. This could be because they are not well informed or that availability is relatively limited compared to other training and career opportunities. The Logo's, who are the superiors, agreed that there are career opportunities and strongly agreed that there are training opportunities. It is concluded then that subordinates are less informed and Logo's should inform them.

A further indicator of how informed FM practitioners are, is how often FM related documentation is used. Documentation, in the research of Moseki, Tembo and Cloete (2011) on building maintenance (see section 2.4), was found to be of the utmost importance and although limited, the PFMA, GIAMA and DODI do set requirements that FM practitioners should take note of (sections 3.3 and 3.6). Therefore, the need to investigate and conclude on the use of these and other documents.

Table 18 indicated the frequency of the use of these documents. On average the SWP, an in-house document, is used weekly with the other documents being used once per month or

less. It could be argued that experienced or trained practitioners do not require to consult documentation that often and vice versa. FM practitioners with up to 5 years' experience never make use of GIAMA or the UAMP, and 75% of FM practitioners with no FM training never use GIAMA, while the professionally qualified FM uses the PFMA, SWP, and Asset register daily and GIAMA, DODI, Log Pamphlet, UAMP, NEMA on an ad hoc basis. It is concluded then that the inexperienced and untrained, which includes all environmental managers and 50% of facility managers, do not consult GIAMA at all, whereas the qualified and experienced practitioner does it on an ad hoc basis. This result is of concern given the findings of Dlamini's (2009) research (section 2.5) which indicated that GIAMA can be used to motivate for more funds. As suggested earlier, experienced practitioners may be skilled and competent enough not to consult documentation as often.

6.2.3 FM practitioners at military unit level are skilled and competent

Making use of documentation is a skill that illustrates the competency of FM practitioners but there are many more skills required by FM practitioners to be regarded as competent. In this section, skill levels will be explored by looking at activities performed and the frequency at which they are performed. Thereafter, previous job experience, tenure in current post, and the use of IT systems are investigated to determine how skilled the FM practitioners are.

The FM activities and the context of its application were determined in general in sections 2.2 (definitions), 2.3 (required competencies), 2.4 (public sector asset management), and specifically in sections 3.3 (GIAMA, PFMA), 3.6 (DODI), and 3.7 (Base level FM). Respondents were then asked to indicate how frequently they perform the tasks/activities and it could be argued that the more frequent the activity, the more skilled you are, given the relevancy of the activities.

The activities and tasks performed by FM practitioners, as a group, were reported in Table 21 and that of Logistic Officers and FM managers highlighted in Table 23. Table 23 confirms previous research that FM managers in the public sector are responsible for all FM activities (Buys and Tonono, 2007), and that military units handle soft and hard services (Dlamini, 2009).

How frequently these activities are performed will differ from unit to unit but Table 23 affords the opportunity to investigate activities of FM for the future, GIAMA requirements, and the environment.

FM of the future, according to authors such as Langston and Lauge-Kristensen (2002), and Jones and White (2008), requires FM managers to be "big picture" oriented, adept at financial analysis, being able to properly measure facility performance (Langston and Lauge-Kristensen, 2002 : p. 6), and also balance strategic business skills with asset skills (Jones and White, 2008). Therefore, issues such as strategic management, asset performance management, financial management and data management are important, and as such, investigated.

Facility managers give strategic advice on a weekly basis but 50% of them never do any strategic planning, which does not prepare them well for strategic business planning or taking a "big picture view". On average, asset performance assessment is done monthly and asset condition assessment annually. Thus, there is no consistency with activities/tasks being done daily, monthly, annually, and ad hoc, and therefore, Filtane's remark that the state property management portfolio was under-utilised and neglected is still valid. When respondents had to indicate the size and condition of property there were discrepancies in the responses from the same unit, a clear result of either being misinformed or not skilled in assessment.

Financial management activities consisted of budgeting which on average is done weekly but 75% actually does it daily; budget reviews on average done monthly and 50% of the cases done weekly; and operating cost analysis which is performed on average monthly. The cost analysis activity is not performed consistently varying from being daily, weekly, and monthly to not being done at all. Given the irregular spending that was noted in the NDPW annual report of 2014/15 of Rb35 one can rate these activities as very important.

With regard to data management the responses ranged from never to daily for each group of FM practitioners. There was exactly one response each for each frequency of handling property data. Although one might think that each unit had someone that performs the

activity on a daily basis the results for units reflect differently. There is only one unit that performs this activity daily, and one that does it weekly. The other two units perform this activity either monthly or on an ad hoc basis. In conclusion, it is argued that the skills are available for taking FM in military units to the next level but are not being applied consistently.

Focussing on the here and now, GIAMA guides FM in the public sector, and therefore, at military unit level it requires: “those management processes which ensure that the value of an immovable asset is optimised throughout its life cycle, which encompasses strategic planning, acquisition, operations, and maintenance management and disposal, as well as measuring the performance of immovable assets in user and custodian departments” (Republic of South Africa, 2007 : p. 4) . As mentioned in section 6.2.1 none of the definitions formulated by respondents referred to life cycle; strategic planning is limited; maintenance and repair is the main focus; and the measurement of financial performance is not consistently applied.

FM managers perform the maintenance required by GIAMA and are busy with emergency maintenance on a daily basis, unplanned maintenance on a weekly basis, and planned maintenance up to four times a month. The high frequency of emergency maintenance raises concerns as mentioned in the literature. Firstly, that maintenance done on a corrective/emergency basis led to inaccurate maintenance estimates, overspending, and premature replacement (Lazarus and Hauptfleisch, 2010), and secondly, that if FM and EM managers get involved in physical execution it could lead to “mis-utilisation of qualified staff officers” (Logistics Division, 1998 : p. 21).

Some of the main GIAMA activities performed by FM practitioners are: analysis of requirements (monthly); completion of the asset register (annually); and budgeting monthly. GIAMA also requires that registers, records, and schedules of property are kept to obtain the best functional, social and financial returns (Buys and Mavasa, 2007; Cloete, 2002). Although it will be the responsibility of the Defence Works Formation to update the immovable asset register on a monthly basis the information will have to come from the military units.

Immovable asset registers are consulted on a monthly basis by FM practitioners and Table 23 indicates that asset registers are completed monthly. The problem is that this is an average. Asset registers are used by 50% of the facility managers on a weekly basis and not at all by the other 50%. Completing the register is done ad hoc, annually, monthly and weekly. So, firstly, how is it is possible to never see the document but still complete the activity? Secondly, the register will most probably not be finalised and will not reflect more accurately in the national balance sheet as promised by Nxesi. Just as GIAMA activities such as the development of infrastructure acquisition and surrender plans, and refurbishment will also not feature.

The importance of the environment has been recognised in the late 1970's and roles and responsibilities developed and promulgated in various documents (sections 3.2, 3.5, and 3.6). Ever since, military unit structures have made provision for an environmental manager post. However, environmental activities are not limited to environmental managers. FM managers, as illustrated in Figure 8 and Table 23, also perform EM activities. The figure illustrates the activities of waste management, nature conservation and base beautification. EM is performed on a monthly basis by FM practitioners, on a weekly basis by FM managers, with 50% of FM managers doing it daily. Of concern, however, is the activities related to energy conservation.

Energy conservation gets limited attention with 75% of FM managers considering it maybe once a year, and Logo's never getting involved. It seems as if energy conservation might be an environmental manager's responsibility because their involvement is on a daily basis.

Current skill levels can be influenced by previous experience, and therefore, it is important to consider the job experience, or as referred to in military lexicon, previous mustering. None of the FM practitioners were previously employed as FM practitioners, and only 42% had FM relevant experience. Considering that 58% has 5 years' or less experience, which is similar to the findings of Buys and Tonono (2007), one would consider their skill levels to be limited. Having 50% of facility managers in this group then requires consideration of the leadership in

the form of Logo's. Unfortunately, one of the Logo's also has no more than 5 years of experience.

Lastly, the skill levels of FM practitioners are reflected on by considering the use of information technology systems (ITS). In section 2.5 Tlhabanelo (2010) listed IT as an FM capability; Buys and Mavasa (2007) referred to "competent personnel with adequate skills to research, verify, capture and correct property data"; and Buys and Tonono (2007) indicated that limited use is being made of IMS within the public sector.

Of the 12 FM practitioners, 6 use some IT system on a daily basis, whereas the other 6 do not make use of any system. So either it is used daily or not at all. Of the six using such a system, three are facility managers. These results could be explained by the non-existence of an ITS in some units, or that manual systems are still in operation. Irrespective, these findings are of concern for the development of FM within the unit and the organisation.

In conclusion it seems that the skills required to transform unit FM practices, to adhere to GIAMA, and to manage the environment are prevalent in some units or with some individuals, but that it is not consistently being employed throughout by everyone. The inconsistency of skill levels can be attributed to limited experience before appointment, short tenure in current postings, or poor empowerment in the form of training and education.

6.2.4 FM practitioners at military unit level are trained and educated

Skill, and ultimately competency, can be influenced by training and education, and there are at least three more reasons why training is important. Firstly, a lack of properly trained FM managers, which was noted by at least one respondent as a problem at military unit level, is linked to the poor condition of state property (Buys and Tonono, 2007; Moseki et al., 2011). Secondly, being suitably qualified or competent is a requirement set in various documents already scrutinised (Logistics Division, 1998 : p. 21 ; Buys and Mavasa, 2007 : p. 1). Lastly, to be considered as professionals, FM managers should be formally trained (Tay and Ooi, 2001). In the case of being a facility manager at an educational institution such as the Military

Academy it may even be required to have an advanced degree (Roper and Payant, 2014). This section will focus on relevant training/education levels, and the membership of FM practitioners to professional EM/FM bodies.

With regard to training and education 41.7% of FM practitioners had no FM training or education, and 66.7% had no EM training or education as illustrated in Table 19. Of the seven FM practitioners that came from an irrelevant FM background, four still have not received any FM training, and five did not do any EM training. The qualitative findings identified skills and training as a theme of problems identified and training as a theme for solutions to FM problems at military unit level. As such, the qualitative findings support quantitative findings.

The facility managers are better qualified since three had some form of FM training with one having an FM certificate/degree. However, none of them had any EM training or education, even though they are responsible for EM. The EM practitioners had no FM training but both had more than one EM qualification, which is in line with the proposal in the draft document of the Logistics division. With regard to membership of professional FM and EM bodies, none of the FM practitioners are members of either.

If the BIFM definition of competence which requires having "the ability to perform activities to the standards required in employment, using an appropriate mix of knowledge, skill and attitude" is applied, one will have to conclude that not all FM practitioners at military unit level are experienced, skilled and qualified to be regarded as competent to perform the FM activities as expected in the relevant DOD FM literature. Secondly, having considered the FM competency of Logo's, it is questionable if the support and guidance is provided to empower the FM practitioners to perform at the highest level.

6.2.5 FM practitioners at military unit level are empowered

There are ample examples in the literature review on challenges faced by FM practitioners, and specifically within the public sector. Moseki, Tembo and Cloete (2011) indicated public FM maintenance constraints that are due to a lack of training and transport, insufficient funding, poor top management support, limited skilled personnel, unavailability of parts, and

the absence of manuals and drawings (Moseki *et al.*, 2011). Roper and Payant (2014) could have been referring to the South African Military Academy when they indicated that educational institutions have their own vagaries with low budgets, input of various academic departments, and lots of bureaucracy (section 2.4). Roper and Payant (2014) added that the public sector FM manager has to deal with facilities far more diverse than in the public sector, with inadequate resources.

At military unit level the qualitative findings suggest that budgets, staffing and training are the main problems experienced which is similar to the results of the research of Roper and Payant (2014) and Dlamini (2009). Some respondents indicated that their unit was dependent on another unit for funding as well as major FM decision-making and as indicated by Payant and Roper (2014) this makes change difficult. Staffing, the structure and training posed difficulty and affects the quality of the work force and the ratio of FM personnel to the number of assets.

Of the four units, there is only one that has vacant property. Although this addresses the concern expressed by Filtane (section 1.1) with regard to being "under-utilised and neglected" it also puts a lot of stress on the limited staffed and trained FM departments. So how well are FM practitioners supported and empowered? On the issue of empowerment, the strategic aspects of resources and capacity needed to support asset management, as identified by Jones and White in Section 2.4, are used to come to a conclusion.

FM function separation is applied within the units and this has led to isolation with regard to budgets and strategic decision-making. Although FM practitioners are consulted, it seems as if they are not part of the strategic planning process, and therefore, cannot promote the value that FM can bring to the organisation.

FM activities are integrated with all logistical activities, which leads to time and resource conflict. With limited budgets, prioritisation needs to take place and if FM managers are not experienced and trained they are not capable of motivating the need for and the contribution

that FM can make in the unit. Some departments within the organisation not only think they can do FM themselves, as experienced by Dlamini (2009), but they actually do it by themselves. This is not effective or efficient.

As warned by Roper and Payant (2014), and experienced by Dlamini (2009), public sector funds and budgets are limited. All respondents listed budgets as one of the main problems faced by FM practitioners at military unit level. As already mentioned, one unit is totally dependent on another for an FM budget. The other units allocate limited funds to FM budgets ranging from 13.5% to 20% of total unit budget, excluding salaries.

A number of FM practitioners are inexperienced and not trained to perform the FM activities and tasks at the highest level. Most practitioners come from FM irrelevant backgrounds and they are not very sure about career and training opportunities. The support they are then supposed to receive from superiors, is limited to the superiors' capabilities, skills and experience.

The last issue with regard to empowerment should most probably be the first issue on any FM agenda and that is strategy and policy. It seems as if the DOD FM strategy process is sound (Figure 1), and if there are ample documents to guide this process (Chapter 3). The problem, however, is that when FM practitioners are asked what FM is and what documents guide their FM activities at military unit level, the responses vary, with sometimes no results. The existence of an FM strategy and documentation at military unit level will empower FM practitioners to perform their activities at the highest level, and should therefore be made available.

It is concluded then that the current scope and understanding of FM at military unit level on the West Coast is to a large extent disjointed. The scope of FM activities, as indicated by different structures, differs from unit to unit. The understanding of FM varies because of the level of operation, experience, training and education. FM practitioners are not all as informed, skilled, trained and educated as they could be if properly empowered by the DOD.

6.3 Recommendations

The following recommendations can be made for the institution, for FM practitioners, and future research.

As alerted to in the previous section, the DOD should develop and /or communicate its FM Strategy down to the military unit level so that all FM practitioners are informed and empowered to perform their work. As such, an FM definition should be formulated at the highest level of the DOD to consolidate the understanding and eliminate misconceptions as to what the work entails. This will ensure a combined and focussed effort towards DOD FM. FM organisational structures should then be developed within units to address the personnel to asset ratio, to empower facility managers to influence decision-making and strategic direction, and to appoint professional people.

FM within the DOD should be a profession with a specified career path, as well as training and education opportunities. Appointments should not be made unless practitioners are experienced and trained, or will be afforded the opportunity to be trained or supported from within their departments. Training and education should not be limited to FM practitioners and the School of Logistics, but should also be presented to stakeholders and by other training and education facilities, such as the Military Academy.

Lastly, ITS and budgets. Some form of FM ITS should be employed within the DOD, and all its units, and FM practitioners should be trained and instructed to use it. Military units should also each have their own FM budgets, and these budgets should support the FM strategy of the DOD. As indicated in the research of Dlamini (2009) GIAMA can be used to motivate for more funds.

It seems as if FM practitioners within the DOD enjoy their work even though they face huge challenges. The following advice is taken from a review of the literature and findings of this research can be used to assist FM practitioners in particular. FM practitioners at military unit level should:

- know the system, be conscious of the regulation and policies, and be flexible;

- build networks, and good communication with suppliers, subordinates, and seniors;
- be cost conscious; and budget more for planned maintenance;
- be technically skilled, experienced, and educated;
- understand the value of IT systems, and
- increase focus on energy conservation.

In order to improve this research, the sample size should be increased. The sample of this research is restricted in region, Arm of service, size, budget and resource allocation, and functions. Including more units will increase the scope of FM activities and experiences, and will also allow for more statistical inferences. Having more units that are identical would allow researchers to identify those structures, activities and competencies that add value, and should be developed.

Further research can also make use of the checklist developed by Tlhabanelo (2010) to measure the shortcomings in policy, programmes and procedures of FM at military unit level. Ultimately, the results of public FM within South Africa should be consolidated and published in book form. Public FM in South Africa is guided by its own acts, regulations and policies, it has its own structures and procurement processes, and it should be managed professionally to serve the needs of its people.

6.4 Conclusion of this research

This research is the result of the need of the DOD to defend and protect the Republic by using its facilities as efficiently and effectively as possible. History indicates that the public service may not be effective in doing so which resulted in the research problem: “The current scope and understanding of FM at military unit level on the West Coast is disjointed”. The aim of the research was to explore current FM practices and understanding at military unit level; to compare it to policy and guidelines, and subsequently, to present a coherent picture of FM at military unit level. To achieve the aim the research question was formulated as: “What is the scope and understanding of FM at the military unit level? To answer this question four research objectives and five research propositions were defined.

The first three research objectives investigated and defined FM, and its required competencies, in general, in the public sector, and within the DOD. The fourth objective determined the current scope and understanding of FM at military unit level, by answering the five research propositions:

- Facility practitioners understand what FM in the DOD entails;
- Facility practitioners are informed to perform FM;
- Facility practitioners are skilled and competent to perform FM;
- Facility practitioners are trained and educated to perform FM;
- Facility practitioners are empowered to perform FM.

Social research, based on the interpretivist paradigm, was applied through the use of case study methodology to allow for an in-depth and detailed study of FM at military unit level. A multi-method approach was applied which studied secondary data, and collected primary data. Secondary data was identified in the literature review and noted in Chapters 2 and 3. The primary data was collected by means of a questionnaire as developed and illustrated in Chapter 4, making provision for ethical considerations, previous research questionnaires, secondary data, and the research objective and propositions. Data was gathered using both open-ended and closed-ended questions resulting in qualitative and quantitative data or a mixed-method. The findings of the data was noted in Chapter 5.

The ultimate story of the data, and answer to the research question, is the result of the complementarity of secondary and primary data. It was concluded that FM practitioners at military unit level have a good understanding of FM in the DOD but there is inconsistency which could result in mixed focus and efforts. Secondly, not all FM practitioners are equally informed as explained by limited unit specific guidelines, knowledge on career and training opportunities, and their use of FM related documents. Thirdly, although most of the skills are illustrated in the activities and the frequency performed, it is inadequate. Everyone does not have the same skills and level of skills. Involvement at a strategic level is limited, and therefore, confines the contribution that FM can make to the organisation. With regard to experience levels, very few practitioners come from an FM related background, and most are

relatively new FM appointees. Of serious concern is the limited availability and use of ITS as a management tool of FM.

Furthermore, not all FM practitioners are trained and/or educated in FM or EM. Although the majority of Facility managers are trained/educated in FM, none of them has any EM training/education. This lack of training and education poses three main concerns. Training is a regulatory requirement, it is linked to state property in good condition, and lastly, is a requirement for any profession. Where there is no training the support of the organisation to empower the FM practitioner becomes so much more important. Unfortunately, the findings suggest that the public sector faces numerous challenges, which result in the untrained and inexperienced being poorly supported and/or empowered.

Although these individuals and organisations may think they are doing an excellent job, the asset register will remain incomplete, the balance sheet will be inaccurate, life cycle management will remain ineffective, and personnel will remain incompetent. More importantly, we may never be aware of the extent of what could have been achieved if FM practitioners at military unit level understood FM, and were better informed, skilled, trained, and empowered.

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APPENDIX A

Confidentiality and Consent

Dear potential participant;

You are being invited in a research study conducted by Bernard van Nieuwenhuyzen, an MSc student at the University of Cape Town. The research is supervised by Associate Professor Kathy Michell of the University of Cape Town and the results of the study will be presented to the Department of Construction Economics and Management in fulfilment of the requirements for the degree of Masters in Construction Economics and Management.

If you have any question or concern about the research, please feel free to contact me, Bernard van Nieuwenhuyzen, anytime at 084 702 0921 or bernard@ma2.sun.ac.za . The research supervisor, Associate Professor Kathy Michell, may also be contacted at Kathy.Michell@uct.ac.za.

Purpose of the study

The primary aim of the study is to explore the scope and understanding of FM (FM) in the public sector, and specifically, at the level of a military unit. The research will make use of triangulation to combine the theoretical framework with the responses of respondents to define the scope and understanding of FM at military unit level.

Procedures

Your participation in this study is voluntary. If you volunteer to participate in the study, you will be consulted on an agreed appointment that would be suitable for the completion of a questionnaire and a semi-structured face-to-face interview. Questions will be asked to qualify answers given in the structured questionnaire. The questionnaire consist of both general and FM related questions.

Potential benefits to participants

At your request, the research findings will be shared with you.

Confidentiality

Every effort will be made to ensure that subjects remain anonymous and that any proprietary information will be safeguarded. Confidentiality of any information is maintained. The information gathered through the interview process will be used solely for this research purpose. The raw data of the interview will only be revealed to personnel directly related to the supervision and marking of this dissertation.

Participation and Withdrawal

You may choose to withdraw from this study at any time of your wish. You may also refuse to answer any question that you do not want to answer.

Rights of research participants

You may withdraw your consent at any time and discontinue participation without any penalty. This study has been reviewed and received ethics clearance through the University of Cape Town Research Ethics Board.

Signature of Research Participant/Legal Representative

I have read the information provided for the research: **Public Sector FM (FM) at Military Unit Level: An Exploratory Study** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____

Name of Participant (please print)

_____

Unit of Participant

_____

Signature of Participant

APPENDIX B

Survey Questionnaire

INTRODUCTION

The purpose of this questionnaire is to measure the scope and understanding of facilities management (**FM**) in military units. There are two sections namely: background, and scope and understanding of facilities management. The instructions at the beginning of each section will assist you in responding. All responses will be treated as strictly confidential.

SECTION A: Background

For each question, make a cross (X) in the appropriate box or provide the required information.

1. What is your post within the unit FM environment?.....

2. How much of your time do you spend on the following FM levels?

	0%	Up to 20%	Up to 40%	Up to 60%	Up to 80%	Up to 100%
Strategic	0	1	2	3	4	5
Tactical	0	1	2	3	4	5
Operational	0	1	2	3	4	5

3. How long have you been employed in your current post?

Less than a year	1
1-5 years	2
6-9 years	3
10 years or more	4

4. What was your previous mustering/corps?.....

5. What is your actual mustering/corps?.....

6. How many personnel do you have in your department / division? .....

7. What professional training have you undergone in Facilities Management (FM) or Environmental Management (EM)?

	FM	EM
None	1	1
Military course	2	2

Diploma or certificate	3	3
Degree	4	4
Other (please specify):		

8. How many years' experience in Facilities Management (FM) or Environmental Management (EM) do you have?

	FM	EM
Less than a year	1	1
1-5 years	2	2
6-9 years	3	3
10 years or more	4	4

9. Do you have a professional membership status for FM (FM) or Environmental Management (EM)?

	FM	EM
Yes	1	1
No	2	2
If Yes please specify:		

10. To which age group do you belong?

20-29 years	1
30-39 years	2
40-49 years	3
50-59 years	4

11. What is the size of your units' property?

…….. m^2 or not sure

12. How many buildings are there in your units' property portfolio?

…….. (Qty) or not sure

13. How many buildings, in your estimation, are not used/vacant?

……. (%) or not sure

(Please rate the condition of your unit by using the attached table)

14. What part of the units' budget is allocated to FM? ……. %

15. What portion of FM budgeted for was received in the current year? ……. %

SECTION B: Scope and understanding of Facilities Management (**FM**)

16. The following list includes various FM statements. Please circle the most appropriate option that indicates to what extend you agree with the statements. The following abbreviations apply: SD=Strongly disagree, D=Disagree, NS=Not sure, A=Agree, SA=Strongly Agree.

To what extent do you agree with the following FM statements:	SD	D	NS	A	SA
FM is the management of buildings and their related services	1	2	3	4	5
FM is the total management of all services that support core-business	1	2	3	4	5
FM is the practice of integrating people, business process and physical infrastructure	1	2	3	4	5
FM is the management of only cleaning and gardening services	1	2	3	4	5
Property management, facilities management and asset management are the same.	1	2	3	4	5
The DOD has a constitutional obligation to assist with the reform and the restitution of land.	1	2	3	4	5
Deteriorating DOD facilities and infrastructure is a risk that has morale implications.	1	2	3	4	5
A change in force structure requires a change in the Defence facilities requirement.	1	2	3	4	5
Lack of knowledge of facilities management results in poor performance of state properties.	1	2	3	4	5
Funding availability is the only causal of state properties decay.	1	2	3	4	5
There are many DOD career opportunities in facilities management	1	2	3	4	5
There are FM learning opportunities within the DOD	1	2	3	4	5

17. The following list covers various acts, policies and documentation. Please indicate whether or not you are currently using any of these for FM purposes. The following scale apply: Never = 1, Ad Hoc = 2, Annually = 3, Monthly = 4, Weekly = 5, and Daily = 6.

	Never	Ad Hoc	Annually	Monthly	Weekly	Daily
GIAMA	0	1	2	3	4	5

PFMA	0	1	2	3	4	5
DODI	0	1	2	3	4	5
Log Pamphlet	0	1	2	3	4	5
SWP	0	1	2	3	4	5
UAMP	0	1	2	3	4	5
Asset register	0	1	2	3	4	5
NEMA	0	1	2	3	4	5
Fill in other:	0	1	2	3	4	5

18. The following list covers activities/tasks. Please indicate how often you are performing any of these activities/tasks as part of your FM responsibility in your unit.

Activities and tasks	Never	Ad hoc	Annually	Monthly	Weekly	Daily
Strategic planning	0	1	2	3	4	5
Budgeting	0	1	2	3	4	5
Health and Safety	0	1	2	3	4	5
Project management	0	1	2	3	4	5
Human resource management	0	1	2	3	4	5
Strategic advice to top management of your unit	0	1	2	3	4	5
Security management	0	1	2	3	4	5
Budget reviews	0	1	2	3	4	5
Health and safety statutory compliance	0	1	2	3	4	5
Environmental management	0	1	2	3	4	5
Energy conservation	0	1	2	3	4	5
Security risk management	0	1	2	3	4	5
Operating cost analysis	0	1	2	3	4	5
Cleaning of property	0	1	2	3	4	5
Horticulture	0	1	2	3	4	5
Complete the asset register	0	1	2	3	4	5
Management of contracts	0	1	2	3	4	5
Preparation of specifics	0	1	2	3	4	5
Analysis of requirements	0	1	2	3	4	5
Condition assessment survey	0	1	2	3	4	5
Verify, capture and correct property data	0	1	2	3	4	5
Emergency maintenance	0	1	2	3	4	5
Unplanned maintenance	0	1	2	3	4	5
Planned maintenance	0	1	2	3	4	5
Asset/Property performance assessment	0	1	2	3	4	5
Liaison with DPW	0	1	2	3	4	5
Liaison with DWF	0	1	2	3	4	5

19. To what extent are the following Information Technology Systems used in your unit for FM?

Information Technology Systems	Never	Ad hoc	Annually	Monthly	Weekly	Daily
Facility Register System	0	1	2	3	4	5
Computer-Aided Facilities Management System	0	1	2	3	4	5
Computerised Maintenance Management System	0	1	2	3	4	5
Other:		1	2	3	4	5

In this section briefly complete the following statements:

20. Define FM in your unit by completing the following sentence. FM in my unit is the:……
……
……

21. The three major problems that face facility managers in units are:
21.1 ……
21.2 ……
21.3 ……

22. The problems in section 21 can be solved by ……
……
……
……

23. The three main benefits of facilities management at military unit level are:
23.1 ……
23.2 ……
23.3 ……

Further remarks: ……
……
……

THANK YOU VERY MUCH FOR YOUR CONTRIBUTION TO THIS SURVEY!

APPENDIX C

Permission to conduct research

RESTRICTED

sa air force
Department:
Defence
REPUBLIC OF SOUTH AFRICA

LBWG/R/520/3/4

Telephone: 022 706 2407 / 2164
Extension: 571 2407
Facsimile: 022 706 2348
Enquiries: Cpl E.M. Koopman

AFB Langebaanweg
Langebaanweg
7375
29 March 2017

To Military Academy
Private Bag x2
Saldanha
7375

Attention: Lt Col (Dr) B.J. van Nieuwenhuyzen

PERMISSION TO CONDUCTING RESEARCH WITHIN THE FACILITY MANAGEMENT ENVIRONMENT AT AFB LANGEBAANWEG

1. Your letter MA/R/520/3/4 dated 15 March 2017 has reference.

2. Your request to conduct research within the Facility Management Environment at AFB Langebaanweg is hereby granted.

3. Awaiting further response with regard to date and time that you wish to visit the Base.

4. For your consideration.

(M.M. MATANDA)
OFFICER COMMANDING AFB LANGEBAANWEG: BRIG GEN

APPENDIX D

Ethics Clearance

EBE Faculty: Assessment of Ethics in Research Projects (Rev2)

Any person planning to undertake research in the Faculty of Engineering and the Built Environment at the University of Cape Town is required to complete this form before collecting or analysing data. When completed it should be submitted to the supervisor (where applicable) and from there to the Head of Department. If any of the questions below have been answered YES, and the applicant is NOT a fourth year student, the Head should forward this form for approval by the Faculty EIR committee: submit to Ms Zulpha Geyer (Zulpha.Geyer@uct.ac.za; Chem Eng Building, Ph 021 650 4791).
NB: A copy of this signed form must be included with the thesis/dissertation/report when it is submitted for examination

This form must only be completed once the most recent revision EBE EiR Handbook has been read.

Name of Student: B.J. van Nieuwenhuyzen Department: Construction Economics and Management

bernard@ma2.sun.ac.za

If a Student: Degree: MSc Supervisor: Prof K Michell

If a Research Contract indicate source of funding/sponsorship: **None**

Research Project Title: Public Sector Facility Management at Military Unit Level: An Exploratory Study

Overview of ethics issues in your research project:

Question 1: Is there a possibility that your research could cause harm to a third party (i.e. a person not involved in your project)?		NO
Question 2: Is your research making use of human subjects as sources of data? If your answer is YES, please complete Addendum 2.	YES	
Question 3: Does your research involve the participation of or provision of services to communities? If your answer is YES, please complete Addendum 3.		NO
Question 4: If your research is sponsored, is there any potential for conflicts of interest? If your answer is YES, please complete Addendum 4.		

If you have answered YES to any of the above questions, please append a copy of your research proposal, as well as any interview schedules or questionnaires (Addendum 1) and please complete further addenda as appropriate. Ensure that you refer to the EiR Handbook to assist you in completing the documentation requirements for this form.

I hereby undertake to carry out my research in such a way that

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

Signed by:

Principal Researcher/Student:	Signed by candidate Bernard Jansen van Nieuwenhuyzen	22/3/2017

This application is approved by:

Supervisor (if applicable):	K.A. Michell. Prof Kathy Michell	31 March 2017
HOD (or delegated nominee): *Final authority for all assessments with NO to all questions and for all undergraduate research*	Nien-Tsu Tuan	4 April 2017
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.		