THE DEVELOPMENT OF A LOCAL LAND RECORDS SYSTEM FOR INFORMAL SETTLEMENTS IN THE GREATER EDENDALE AREA

by

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ABSTRACT

This dissertation examines the various forms of informal settlements in evidence in the Greater Edendale Area, and extracts the design criteria for the development of an appropriate land records system to manage these informal settlements and their upgrading processes.

It is shown that the various settlement patterns in existence in the Greater Edendale Area (GEA) reflect the apartheid history of South Africa and the policies of the previous governments. All exhibit certain aspects of informality, and therefore exist at various points on a continuum of formality-informality. Certain settlement patterns, such as the properties within formal townships developed by the former Department of Development Aid, possess many formal aspects and relatively fewer informalities, whereas others, for example the conventional informal settlements on State owned land, are informal in almost every respect.

It is shown that the government's policies require informal aspects of settlements relating to land tenure and services should be upgraded, and that the responsibility for such upgrading has been delegated to the local government level. I will show that this upgrading of informal settlements can be broken down into four major processes which make up the overall upgrading process. These are land delivery, land tenure reform, provision of services, and cost recovery. It is argued that to effectively deal with these upgrading responsibilities, the local government structure, in this case the Pietermaritzburg-Msunduzi Transitional Local Council, should develop and maintain a land records system at the local level, with community participation to ensure sustainability.

The design requirements for such a system are identified throughout the chapters, and are drawn together in the final chapter as a set of design criteria for the land records system. These design criteria can be represented by five main themes: firstly, that the land records system should be based on the design of the multipurpose cadastre; secondly, that in addition, it should accommodate non-parcel-based tenures; thirdly, that it should incorporate temporal GIS technology; fourthly, that it should be easily accessible to the community; and finally, that it should incorporate the users' needs and should be extremely user-friendly.

PREFACE

This is to certify that this whole dissertation comprises my original work, except that where other material is used or experts in their field are interviewed, due acknowledgement is made in the text.

This dissertation has not been submitted, in whole or in part, to any other University.

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GLOSSARY OF TERMS AND ACRONYMS

CAD	**Computer Aided Draughting / Computer Aided Design**
City	The City of Pietermaritzburg, immediately prior to incorporation into the TLC.
DDA	**Department of Development Aid**, the government department which controlled the SADT, and which therefore controlled land for Blacks, as well as almost every aspect of their lives. It was disbanded on 1 April 1992, and the control previously exercised by this department was passed to the Administrator of the province concerned.
DDA general plans	General plans which were surveyed and prepared in terms of the Land Survey Act (then Act 9 of 1927), but which did not take into account any underlying cadastral records. These general plans could not be approved by the Surveyor General nor registered by the Registrar of Deeds, and are therefore inferior to freehold general plans.
DFA	**Development Facilitation Act (No 67 of 1995).**
Data (and information)	Data are raw collections of facts, held in alpha-numeric form, or graphically, or as digital images (Dale and McLaughlin: 1988: 8). Information is processed data which is presented in a combined and meaningful form, and which can be understood and used by decision makers (*loc. cit.*).
Edendale Proper	The farm Edendale No 775 (previously Welverdiend), being the north western quarter (roughly) of the GEA. This land is totally under freehold ownership. The word 'Proper' is to distinguish it from the wider area, including large tracts of state land which is often referred to generally as Edendale.
GEA	**Greater Edendale Area**, comprising Edendale proper, Edendale East, Imbali, Slangspruit, Ashdown and Plessislaer.
GIS	**Geographic Information System** (see Para 6.2 below).

Induna	One of a Zulu chief's most senior officials. Pl. *Izinduna*, although I use the pl. *indunas*, which is more common in English usage.
Information (and data)	See Data (and information) above.
KZNPA	**KwaZulu-Natal Provincial Administration**.
LIS	**Land Information System** (see Para 6.2 below).
NGO	**Non-Governmental Organisation.**
PMTLC	**Pietermaritzburg-Msunduzi Transitional Local Council.**
Political cleansing	(Of an area), where political extremists chase out any landowners who are not affiliated to the correct political party for which that area has been chosen.
Proclaimed township	Proclaimed as a town for the occupation of Black persons in terms of Section 30(1) of the Black Administration Act (No 38 of 1927).
PTO	**Permission to Occupy Certificate**, a temporary personal right in land, created in terms of Proclamation R188/1969, and issued to a person as authority to occupy a specified portion of land in an unproclaimed area.
SADT	**South African Development Trust,** the (most recent name of the) trust created under the Native Trust and Land Act, No 18 of 1936, created to control land for Blacks.
ULTRA (Act)	**Upgrading of Land Tenure Rights Act (No 112 of 1991).**
UNCHS	**United Nations Centre for Human Settlements.**

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Government policies for the most part of this century have created the circumstances which have led to a range of informal settlement types developing throughout South Africa. Many Blacks have had little option but to live in such informal settlements. Durand-Lasserve estimates that, on average, in developing countries, informal housing and informal urban growth affect more than 40% of the population (Durand-Lasserve: 1996: 1). As a result of a recently completed *Masakhane* questionnaire-survey in the Greater Edendale Area, which will be discussed below (see Chapter Two), it has been found that informal housing makes up around 60% of the total housing of the Greater Edendale Area (GEA) (see Map #9 in Appendix A). The new South African government seeks to improve the situation regarding informal settlements.

The most common form of informal settlement in urban and peri-urban areas generally, is the conventional informal settlement, which is composed of "dense settlements comprising communities housed in self constructed shelters under conditions of informal or traditional land tenure" (Hindson and McCarthy: 1994: 1). In addition to this conventional form, the previous governments' policies have also had the effect that some settlements in which Blacks live, which appear to be totally formal, that is, where all aspects of the land tenure, servicing, and housing appear to be in accordance with the "legal, urban and environmental standards set by public authorities" (Durand-Lasserve: 1996:1-2), are on closer examination not so, and are informal. I will show (see Chapter Three) that informal settlements exist on a continuum of formality-informality, where the various aspects of each settlement range between total formality, and total informality.

One of the major focusses of this dissertation, are the land tenure issues relating to informal settlements, in relation to the upgrading (tenure and services) of these settlements. I will show (see Chapters Four and Five) that the land tenure patterns which have developed in the Greater Edendale Area (GEA) are due to

the policies of the past governments, and are varied and exist on the continuum of formality-informality. Examples of this formality-informality, which are described more fully below (in Chapter Three), in relation to land tenure issues are: firstly, the (apparently formal) freehold privately owned properties in Edendale Proper which have not been registered or where the registration is not current; secondly, the inferior titles registered under legislation relating to the former Department of Development Aid; thirdly, the unrecorded tenure rights of tenants on privately owned land in so-called 'backyard shacks'; and finally, the unrecorded *de facto* tenure rights and informal land holdings of the conventional informal settlements on State owned land.

With respect to the latter, where I am referring to land tenure rights which appear to be established by virtue of the occupation of the ground, but where it is not known whether the occupant has rights to the land or not, as in a conventional informal settlement, I shall refer to them as *de facto* land tenure. *De facto* is defined as "in fact, whether by right or not", and *de jure* is defined as "by right" (Oxford: 1982: 249, 251). I am aware of, but have not taken into account in this dissertation, the two recent pieces of legislation, being the Interim Protection of Informal Land Rights Act (No 31 of 1996) and the Prevention of Illegal Eviction From and Unlawful Occupation of Land Act (No 19 of 1998), which could have the effect of transforming this *de facto* tenure into *de jure* rights in some instances. However, I argue that, in any event, the definition of *de facto* takes care of that eventuality. These two Acts have not been dealt with in a substantive way in this dissertation because of the limitation on time, but the recommended design criteria (Chapter Seven) will accommodate the effects of these Acts, by enabling easy updating of tenure rights where appropriate.

I will show (see Chapter Two) that the present government has taken steps to improve the situation concerning informal settlements and has published policies and legislation in this regard. There are policies firstly, in relation to the right of all people to a safe and healthy environment (South African Government: 1996a: 10), and for sustainable ways to be found to meet the needs of communities and to improve their quality of living (South African Government: 1998a:15-16), including the delivery of services in a sustainable manner (*ibid.*: 43). Secondly, there are policies regarding the implementation of a land delivery and land tenure reform programme which will provide for, *inter alia*, the extension of security of tenure to all South Africans (South African Government: 1997b: 7), the upgrading of land tenure which is insecure in law as a result of past racially discriminatory laws or practices (South African Government: 1996a: 11), and the development of a variety of diverse new forms of tenure which reflect the tenure arrangements on the ground and which are more appropriate for the circumstances of the people (South

African Government: 1997b: 60). Thirdly, I will show that, also contained in government policy, is the decentralisation of the responsibilities for the upgrading referred to above, to local government level, so that decisions can be made, with the involvement of the local community, at the level where there is closer contact with the potential beneficiaries of the land tenure reform and upgrading programmes (*ibid.*: 98, South African Government: 1998a: 37).

As a result of the history of South Africa reflected in the Greater Edendale Area and these government policies, I will show that the upgrading of informal settlements can be broken down into four major processes which make up the overall upgrading process. These are land delivery, land tenure reform, provision of services, and cost recovery. These processes of upgrading shall be discussed in more detail below (see Chapter Two).

The main focus of this dissertation, however, is the design of an appropriate land records system which should be established at the local government level to manage these four processes of upgrading. In each chapter I will extract those features which will have an impact on the design of an appropriate land records system to manage the upgrading process. I will show (see Chapter Six) that such a land records system should be a form of land information system (LIS), and should be based on the design of the multipurpose cadastre, as this system satisfies many of the information requirements and design criteria of the land records system identified in the preceding chapters. However, although a LIS is almost invariably parcel-based (Arrowsmith: 1989: 11; Barnes: ND: 2; Ezigbalike, Rakai & Williamson: 1995: 14), but need not necessarily be so (Dale & McLaughlin: 1988: 11; Latu: 1995: 25), a multipurpose cadastre is always parcel-based (Dale & McLaughlin: 1988: 63; Barnes: ND: 4). Therefore, the land records system will not be wholly a multipurpose cadastre, but I will show that the land records system should be a form of multipurpose cadastre, incorporating its design, but with additional information requirements and design criteria specifically for the informal settlements in the GEA. This additional data would not normally form part of the design of a multipurpose cadastre. The main set of additional data required is that of the various informal non-parcel-based tenures found in the GEA, in addition to the formal parcel-based cadastral records in the land records system, which I argue, should both be accommodated in a dual land tenure system. The other set of additional data required is historical data, to record the trails of legal evidence to facilitate the adjudicatory process. Finally, I shall summarise (in Chapter Seven) the requirements from all the other chapters to present a conceptual design of an appropriate land records system to manage the processes of upgrading informal settlements in the Greater Edendale Area.

1.2 An Introduction to the Pietermaritzburg - Edendale Area

In this section I begin by introducing the Pietermaritzburg-Edendale Area and the history of its early land tenure patterns and land administration systems. Thereafter I will present and briefly discuss the various land tenure patterns in evidence in the PMTLC area as a whole, to contextualise the study area of the GEA (Chapters Two to Seven). I then present a summary of the contents of each of the chapters of this dissertation. Finally I shall discuss my research methods, including my credentials and background experience.

The City of Pietermaritzburg is one of the capitals of the province of KwaZulu-Natal (the other being Ulundi in the former KwaZulu), and is situated in the KwaZulu-Natal midlands, on the national road between Durban and Johannesburg. The borough of the old City (pre-1995) covered approximately 14 809 Ha, with a population of around 180 000, made up of all the various population groups (Ref.- field notes). The old City had a classical so called 'White' city structure, with a central business district, and separate areas for residential, industrial, commercial and educational land uses around it, as well as public open spaces and other facilities for recreation interspersed.

The Greater Edendale area (GEA) is approximately 8 600 Ha in extent and lies immediately to the south west of the old City of Pietermaritzburg (see Map #1) (KZNPA: 1995: 1). It is an area which was proclaimed for occupation by Blacks, by various Proclamations in terms of the previous government's *apartheid* policies. The Edendale area contains a population of around 190 000 people (*loc.cit.*), although other estimates put the population at around 330 000 (Integrated Planning Services: 1995: 88). This latter report admits though, that there are large and unsatisfactory differences in population figures for the area. There are very few employment opportunities in the formal business sector in the Greater Edendale Area itself - for all intents and purposes it is a dormitory-town of Pietermaritzburg (KZNPA: 1995: 1-5). Part of the land is owned in freehold title, while the majority is State owned. There are no tribal areas within the Greater Edendale Area. The Greater Edendale Area was recently incorporated (in mid-1995), together with the old City of Pietermaritzburg, the farms Shenstone and Ambleton, and other minor pieces of land, to make up the Pietermaritzburg-Msunduzi Transitional Local Council area (refer to Map #1) (Ref.- field notes).

Pietermaritzburg was first settled in 1838 (Haswell: 1988: 24). The town was surveyed and laid out by Greyling, in a similar fashion to other towns which Piet Retief's party of Voortrekkers had established, such as Congella, Weenen, Utrecht, and Lydenburg, with erven of approximately 450 x 150 feet (about 137 x 46 metres). By April 1839 more than 120 erven had been granted (*ibid.*: 24-25). Ownership of land was reserved for the Voortrekker citizens, or *burghers*.

It has not been possible to establish with certainty, from the references I have consulted and people I have interviewed from the Surveyor General's office, exactly what records were kept of the original survey of Pietermaritzburg. However, a plan called a "General Plan of Pietermaritzburg" dated "November 1845", showing dimensions and Erf Numbers, was prepared of the survey of the centre of Pietermaritzburg by the "Government Surveyor" (Haswell: 1988: 22). It was general practice of the *Volksraad*, since 1838, to issue grants of farms and erven in Natal to the Voortrekkers. These were registered in Cape Town until the first Registrar of Deeds in Natal was appointed in 1846, when the records pertaining to property in Natal were returned (Lester and Teversham: 1995: 103). Therefore it appears that records were kept of the earliest property surveys and registration of ownership in Pietermaritzburg.

British authority over Natal was proclaimed in 1843, and the majority of Voortrekker families moved inland. British immigrants moved into town in their places, and started to subdivide the original plots. By 1854 when the first elected Town Council was formed in Pietermaritzburg, the borough consisted of some 460 erven and around 26 000 acres (10 500 Ha) of Townlands (commonage) (Wills: 1988: 27). Land rights in the old Pietermaritzburg City part of the PMTLC area, as well as in parts of the GEA, became highly formalised, and comprised almost exclusively freehold rights in terms of the South African cadastral and registration systems. However, I will show that Blacks were largely prevented from owning land, and were forced to live only in areas designated for occupation by Blacks, where titles to land were either not recorded at all, or were recorded in a dual registration system which was considered to be inferior to, and less secure than, freehold title. I will show that these factors had a profound influence on the evolution of land tenure and land administration in the GEA, and on the development of informal settlements in the area.

The way that the Voortrekker towns were laid out effectively separated the colonists from the indigenous population. The Black residents were expected to provide their own accommodation on the periphery of town, although usually accommodation was provided for certain categories of employees, in barracks,

hostels or compounds (Wills: 1988: 33-35). One exception was Sobantu Village which was set out on a portion of the Pietermaritzburg Townlands in 1923, specifically for occupation by Blacks (*ibid.*: 40).

In terms of the Native (Urban Areas) Act of 1923 and its amendment in 1937, Black residential areas were effectively restricted to the distant fringes of the City (*ibid.*: 41). Furthermore, from around 1950 onwards the government established segregated areas or Group Areas for the race groups other than Blacks, in an attempt to eliminate what they termed the friction between the various race groups in the Union of South Africa, and later the Republic (*loc.cit.*). The government implemented this policy in practice by separating the racial groups physically by buffer zones, and by forcing people who found themselves in the wrong race group areas to move to their correct group areas, as legislated by the government. In this way group areas for Whites, Indians and Coloureds were created in the City, as well as in the rest of the country. The Group Areas Act (1950) effectively prevented the extension of Sobantu Village *in situ*, and diverted any additional African residents in the city to the Black townships of Edendale Proper, Ashdown and Imbali, all to the south west of Pietermaritzburg (*loc.cit.*) (See Map #1).

Several factors such as the abolition of influx control, which had previously restricted the movement of Blacks, and widespread mobilisation against Black landowners during the latter 1980s, resulted in the mass urbanisation of Blacks. Blacks started to squat on privately owned land in urban areas, generally, and settled informally in great numbers on State and municipal owned land within and on the peripheries of most towns and cities (Hindson and McCarthy: 1994: 8). From my observations this was also true of the Pietermaritzburg/Edendale area.

I conclude, even in the early days of the founding of Pietermaritzburg, land rights were formally recorded, and the land in Pietermaritzburg was reserved for residence largely by Whites only, while Blacks were forced to reside in the neighbouring Edendale valley which was developing in parallel with Pietermaritzburg. The history of the land tenure patterns and land administration systems which resulted in the GEA area are discussed below (see Chapters Four and Five).

1.3 Various forms of Land Tenure in the Pietermaritzburg-Msunduzi Transitional Local Council Area

I will begin by introducing and briefly describing the various forms of land tenure in existence in the PMTLC area, for the purpose of defining them for use throughout this dissertation. I will show that the forms of land tenure vary in formality from formal registered freehold title to informal land holdings with no legal standing.

Starting at the most formal end of the scale, are those freehold rights which are formally surveyed in accordance with the Land Survey Act (No. 8 of 1997) (which recently replaced the Land Survey Act, No. 9 of 1927), and registered as freehold title in terms of the Deeds Registries Act (No. 47 of 1937). Under this system of tenure the holder of the rights enjoys full ownership and maximum control over the land. These cadastral and registration systems in place in South Africa are considered world-wide to be of the best, from the aspects of security of title and accuracy (Lester and Teversham: 1995: 104; Barnes: ND: 23, citing Simpson: 1976).

I have established that all land in the PMTLC area has been surveyed and registered, and is in the ownership of either private individuals or the State. Land which is held in this manner shall be referred to as 'freehold land' or 'land under freehold title'. I will show (see Chapter Four) that there is, however, some land under private freehold title which has been informally transferred, without registration of the transaction. In these cases, I argue, land rights which appear to be freehold, have become partially informal, in the sense that the rightful owner of the land is not recorded in the formal records.

I will also show (see Chapter Four) that on some of the State owned freehold land in the Greater Edendale Area of the PMTLC, inferior land rights or permits, not surveyed and registered as described above, were granted to Black people living there by the previous government (see Map #3). I will show (in Chapter Four) that these inferior land rights and permits range in sophistication, formality and security, but even the strongest is not as secure as freehold title, and they are therefore generally not favoured by the community.

I will show further (see Chapter Five) that there is also *de facto* land tenure where a community or individuals have occupied freehold land owned by the State in conventional informal settlements for some

time, perhaps for generations, and they have acquired rights in the land due to their sustained occupation of it (see Maps #5 and #6). There may also be informal land holdings where people have invaded land illegally without the owner's permission.

Finally, I will show that there are dense informal settlements in the form of backyard shack settlements on many of the privately owned properties in Edendale Proper and parts of Plessislaer (see Maps #1 and #4), where unrecorded landlord-tenant arrangements exist between the informal settlers and the landowner (see Chapter Five). These are the most dense of all informal settlements in the GEA.

I will describe these various formal/informal and inferior land rights and land holdings in more detail below (in Chapters Four and Five), and show that they comprise the various different forms of informal settlement, and that there is a need for them to be upgraded.

1.4 Content of Chapters

1.4.1 Chapter Two: The Government's Land Tenure Reform and Upgrading Policies

I begin in Chapter Two by identifying the three main recent pieces of legislation and legislation-in-progress which establish the government's policy regarding the upgrading of informal settlements. These are the Constitution of the Republic of South Africa (1996), the White Paper on South African Land Policy (1997), and the White Paper on Local Government (1998). I will show that these policy documents refer to the four main processes in the upgrading of informal settlements, as identified above, being land delivery, land tenure reform, provision of services, and cost recovery.

I will show that land delivery related to informal settlements in an urban area, comprises the processes by which land is formally made available for the settlement, with the authority of the local government structure, for the upgrading of the informal settlement. This may be a so-called '*in-situ* upgrade' where the informal settlement remains largely in the same location, or it may be a so-called 'greenfields upgrade' where the settlement is relocated to an alternative piece of land. I will show that all three of the abovementioned policy documents deal with land delivery, and require that the local government body for the area attends to this issue as a priority.

I will continue by describing certain aspects of the government's land tenure reform programme as they apply to informal settlements, and show that it is the local authority's responsibility to institute such land tenure reform measures in accordance with the Constitution of the Republic of South Africa (1996), and the White Paper on South African Land Policy (1997). I will show that land tenure reform comprises two separate processes; the upgrading of existing inferior land rights, and the development of innovative new land tenure models for new land rights to be created in the future. Upgrading existing land rights includes the process of ascertaining the trail of legal evidence in respect of existing land holdings to establish valid existing land rights. Regarding new land tenure models, I will show that the government's policies require that a variety of flexible and diverse tenure systems must be available, including both group-based and individual-ownership-based systems, and that the people should be able to choose the appropriate tenure system for their land holdings from this diverse range. I will then describe the principles of the two fundamental tenure systems referred to, namely the group-based tenure system and the individually-based system.

Regarding the provision of services, I will also show that, in terms of the government's White Paper on Local Government (1998), the local authority is obliged to physically upgrade informal settlements within its area of jurisdiction, and to provide, at least, essential services to the residents of such settlements in a sustainable way, and to provide a healthy living environment for all its residents. The final process of cost recovery applies mainly to the provision of services. It is government policy that the local authority should look to effectively managing the sustainability of settlements in its area of jurisdiction by instituting cost recovery measures, including the collection of payments from the owners and occupants for municipal rates and taxes and for municipal services used.

I will show that, in order to manage the processes involved in the management and upgrading of informal settlements, an appropriate land records system, with reliable and accessible records of the settlement and the people in it, is required. The implications of these government policies and legislation, and of the two fundamental land tenure reform systems proposed, namely the group-based and individually-based ownership systems, on the design of the land information system will be investigated.

1.4.2 Chapter Three: A Conceptual Framework for Informal Settlements in the Greater Edendale Area

In Chapter Three I examine some broad definitions of informal settlements from both local and international literature, and show that informal settlements in the GEA conform to these broad definitions. I will show that, because of the history of South Africa and of the land tenure patterns and land administration systems for Blacks in the country, all settlement in the GEA exists at various levels on a continuum of formality-informality. There are varying aspects of informality in every form of land tenure in the GEA, even in those land tenure patterns which appear to be totally formal. Finally, I will evaluate the effects of these findings on the design of the land information system for informal settlements in the GEA.

1.4.3 Chapter Four: The History of Recorded Land Tenure Rights in the Greater Edendale Area

In Chapter Four I will describe the history of the recorded land tenure rights and land administration systems in South Africa, and more particularly in the Greater Edendale Area, and evaluate the effects that this history has had on the land tenure patterns in the GEA. I will show, for example, how the previous government's *apartheid* policies played a big part in the development of informal settlements of various types and at various levels on the continuum of formality-informality, with distinct variations, dependent on the different types of underlying tenure. I will also show that as a result of past government policies, and the history of land tenure patterns and land administration systems in the GEA, certain aspects of all forms of land tenure in the GEA, even the (apparently formal) recorded freehold rights, contain informalities of one kind or another, and fall somewhere on the continuum of formality-informality described, and therefore should be upgraded. Examples of this informality, are: firstly, the privately owned freehold properties in Edendale Proper which have not been registered or where the registration is not current; and secondly, the inferior titles registered against surveyed portions of State owned land under legislation relating to the former Department of Development Aid.

Furthermore, I will show that the history of the recorded land tenure patterns and land administration systems in the GEA means that the national government's current policies, as outlined in Chapter Two, have particular applications in the GEA. It is these applications which also need to be incorporated into the design of the land information system. I will conclude by extracting those aspects which will have an

impact on the design of the land information system to be created to manage informal settlements in the GEA.

1.4.4 Chapter Five: Unrecorded Land Tenure in the Greater Edendale Area

In Chapter Five, I shall firstly discuss the various forms of informal settlements with unrecorded tenure in existence in the GEA, and examine the characteristics of the land tenure patterns found in these settlements. I will describe the conventional informal settlements with *de facto* land tenure on State owned land, and the backyard shacks and (backyard) shack-farming, depending upon the scale of the backyard shack settlement, on privately owned land. I will discuss the dominance of the tenure rules of the Zulu customary land tenure system and show how these tenure rules have been modernised and adapted to the urban situation for use in the conventional informal settlements on State land. I will also discuss the unrecorded landlord-tenant arrangements in the backyard shack settlements on privately owned freehold land. I will show that these informal settlements are a result of the history of the country and of the past governments' land related policies, and that they, and their land tenure patterns fall under the ambit of the present government's land tenure reform policies discussed in Chapter Two. Finally, I shall extract the requirements for the design of the land information system to manage the upgrading land tenure and services of these informal settlements with unrecorded land tenure in the GEA.

1.4.5 Chapter Six: Land Information Systems

In Chapter Six I will investigate land information systems in general and their principal components, and then examine the multipurpose cadastre as described in international literature. I shall conclude that the land records system for the GEA should be a form of land information system, and should be based on the design of a multipurpose cadastre, but with additional records which have been identified in the preceding chapters, specific to the various forms of informal tenures in the GEA. The two main additional classes of records which do not normally form part of the design of a multipurpose cadastre, but which should be included in the design of the land records system for the GEA, are non-parcel-based informal tenures and temporal (historical) records.

In discussing the principal components of a land information system (or land records system), I stress the importance of the people component, without which the system could not exist. The other three components, being the information base, the technology, and the procedures, standards and protocols, are

more technical in nature, and are also vital to the design of the land records system and to ensure the success and sustainability of the system, but not as critical as the people component.

Finally, from the information requirements identified in the preceding chapters and Chapter Six, I shall identify the five main themes which should be covered in the design of the land records system for the GEA. These are firstly, that the land records system should incorporate, but go beyond, the design of the multipurpose cadastre; secondly, that the land records system should accommodate the non-parcel-based land tenures in the GEA, as well as the cultural values embodied in the tenure rules of the adapted urban form of the Zulu customary land tenure system, which are in use in the conventional *de facto* informal settlements in the GEA; thirdly, that the system should incorporate the latest temporal GIS technology so that the historical information of the trail of legal evidence for the adjudication of land rights can be accommodated; fourthly, the land records system should be readily accessible to the community in the GEA, both in terms of location and cost; and finally, the land records system should be designed to be sensitive to the needs of the various users, and to be extremely user-friendly, mainly in its interface with the users, but also in its data storage and input/output modes.

1.4.6 Chapter Seven: The Conceptual Design of the Local Level Land Records System

In this final chapter I begin with a review of the background to the development of the land records system for the GEA developed throughout this dissertation, including the four processes involved in the upgrading of informal settlements in the GEA, and the five themes to be taken into consideration in the design of the land records system. Thereafter, I examine the information requirements and design criteria from the preceding chapters within the framework created by the five main themes for the design of the land records system identified in Chapter Six, and I show that the five main themes contain the required framework to address all the requirements identified.

I then recall the four processes involved in the upgrading of informal settlements in the GEA, namely land delivery, land tenure reform, provision of services and cost recovery, and show that these processes require the tools developed by the five themes for the design of the land records system for the GEA. I conclude that the upgrading of informal settlements, and therefore the four processes, are necessary due to government's policies and legislation, and that the four processes of upgrading rely on the tools created in the five themes for the design of the land records system. It is therefore necessary for the PMTLC to

develop the land records system for the management and upgrading of informal settlements in the GEA, which I have shown, should be accessible and managed at the local level.

I conclude by outlining the PMTLC's land information system, and showing that the PMTLC has the basic land information system and data to implement a land records system as described in this dissertation, but that it needs to be expanded in certain areas to accommodate the design criteria and information requirements identified in this dissertation. I also identify the topics and challenges which have not been fully explored, but which need to be further investigated as they may have an effect on aspects relating to the information requirements or system design identified in this dissertation.

1.5 Research Methods

In researching and writing this dissertation I have made comprehensive use of literature, and where this has not been available, personal communication and interviews with people who are considered to be experts in their various fields.

As a basis for the understanding of the issues being researched and discussed, and for a source of some of the material in this dissertation, I use my twenty years in the land survey industry. Of these years, the first four were spent completing my articles and working as a junior Professional Land Surveyor in private practice in Johannesburg, the next four of which were as a Professional Land Surveyor in private practice in Pietermaritzburg, and the balance of which have been as a Professional Land Surveyor in the Pietermaritzburg City Council (as it was known prior to 1995), and (since 1995) the Pietermaritzburg-Msunduzi Transitional Local Council, which incorporated large areas of the neighbouring Greater Edendale Area. For the past eight years I have occupied the post of Chief Land Surveyor, in charge of the Land Survey Branch of this local government body.

During my years in private practice in both Johannesburg and Pietermaritzburg I obtained experience in the survey of land rights in several Black townships in Gauteng, Free State and KwaZulu-Natal, but mainly in Soweto and Edendale, and had a certain amount of exposure to the lesser forms of tenure under which Blacks held their rights to land. In the PMTLC the Land Survey Branch is responsible for carrying out various land surveys on behalf of the TLC, including from time to time surveys for the upgrading of informal settlements. It is also responsible for the co-ordination and approval of applications for the

subdivision of land within the TLC area, including the upgrading of informal settlements via the formal land delivery system, incorporating the formal cadastral and registration systems.

The Land Survey Branch also manages the PMTLC's land information system, which contains information relating to cadastral, ownership, valuation, topographical, and municipal services records as its main data sets. The data sets relate mainly to the formal areas, and the formal services which are in place. The challenge remains to collect and manage all relevant information regarding informal settlements, to facilitate the management of these settlements.

I was also a member of the PMTLC's *Masakhane* Task Team which designed the questionnaires for the questionnaire-survey to collect information from every household in the GEA as part of the PMTLC's *Masakhane* programme (see Chapter Two). The data captured from this survey has just been received and downloaded into the land information system in the Land Survey Branch (in June 1999), and sample plots of maps from this information are included as Maps #7, #8 and #9 in Appendix A. This new information holds the promise of being very valuable for decision making, and in particular for planning the upgrading of informal settlements and their services in the Greater Edendale Area. The design of an appropriate land records system to support such a process represents the focus of this dissertation.

CHAPTER TWO

THE GOVERNMENT'S LAND TENURE REFORM AND UPGRADING POLICIES

2.1 Introduction

There is a need for the management of informal settlements and for upgrading, including land tenure reform and the physical upgrading, of these settlements, and for the management of the processes involved. In terms of the definitions of informal settlements adopted for the GEA (see Chapter Three) and due to the policies of the previous governments, most of the GEA is covered by settlements which exist at various positions on a continuum of formality-informality. In addition, these informal settlements are not confined to the conventional form of informal settlement. Land tenure reform and upgrading, relating to informal settlements, are the subject of policies of the government, in order to address the inequalities of the past. I will show that a land records system, containing information about the settlement and the people in it, is necessary for the purpose of managing these processes. I will also show that it is government policy that the upgrading is done in a sustainable manner, and that the responsibility for the upgrading and cost recovery is decentralised to the local government level. I will deduce therefore, that it is at this local level where the land records system should be established and managed, to facilitate the processes of land delivery, land tenure reform, provision of services, and cost recovery which will be discussed below.

I will begin by identifying the government's major policy documents and outlining its main policies on the subjects of upgrading of informal settlements, decentralisation of these responsibilities to the local government level, and information, before discussing the policies relating to the four main processes involved in the upgrading of informal settlements in more detail.

2.1.1 Government Policies

There are three principal pieces of recent legislation and legislation-in-progress, namely the Constitution of the Republic of South Africa (Act No. 108 of 1996), the White Paper on South African Land Policy (1997), and the White Paper on Local Government (1998), which establish the government's main policies on the four processes involved in the upgrading of informal settlements (identified in the previous chapter). In terms of these, the obligations of land delivery, land tenure reform and the upgrading of informal settlements in a sustainable manner are established, and the responsibility is placed on the local government level to put these measures in place. I will briefly describe each of these policy documents.

2.1.1.1 The Constitution

Firstly, the Constitution of the Republic of South Africa (1996), is the supreme law of the country, and any "law or conduct which is inconsistent with it is invalid" (South African Government: 1996a: 5). Furthermore, any "obligations imposed by it must be fulfilled" (*loc. cit.*). The Constitution deals with mainly basic human rights, including the right of all people to safe and healthy living conditions. It also covers several issues relating to land and land tenure reform, and the responsibilities of local government in this respect (*ibid.*: 7-22).

2.1.1.2 South African Land Policy

Secondly, the White Paper on South African Land Policy (1997) deals mainly with the rural situation, and as such devotes a considerable amount of attention to issues such as the redistribution of land, restitution claims, and occupants of privately-owned land, including farm-dwellers, all of which have strong rural connotations. It also, however, deals with issues which have more relevance to the urban situation. For example, the White Paper specifically mentions the implementation of a land delivery and land tenure reform programme which will provide, *inter alia*, "security of tenure for all", and the rapid release of land for development (South African Government: 1997b: 7). It also deals specifically with "informal settlements in urban areas" where it makes the point that, as part of land tenure reform, it is necessary to bring informal settlement areas within the ambit of the "law and functional land administration systems" (*ibid.*: 33). In addition the White Paper on South African Land Policy deals with institutional arrangements, including the "decentralisation of functions and authority" (*ibid.*: 97) and the requirements for land information (*ibid.*: 106). I will be discussing and referring mainly to those parts of the White Paper which deal with land delivery, land tenure reform and decentralisation in the urban context.

2.1.1.3 Local Government

Thirdly, the White Paper on Local Government (1998) briefly describes the history of local government in South Africa under the *apartheid* policies and legislation of the previous government, and goes on to propose a vision of a "developmental local government", which represents a transformation of the old municipality, and which "centers (*sic*) on working with local communities to find sustainable ways to meet their needs and improve the quality of their lives" (South African Government: 1998a.:15-16). The White Paper on Local Government also deals with service delivery systems and approaches for the transformation of these systems are put forward (*ibid.*: 18). As such, the White Paper on Local Government aligns very closely with the fundamental ideologies for local government outlined in the Constitution of the Republic of South Africa (1996) and the policy of decentralisation contained in the White Paper on South African Land Policy (1997).

2.1.1.4 Linking the Policies

The Constitution establishes, and the two White Papers reinforce, the fundamental principle that everyone has the basic right of a place to live, and to live in an environment which is healthy and safe (South African Government:1996a: 10-11; South African Government: 1997b: 7, 25; South African Government: 1998a.: 37-38), which, I argue, implies an improvement of living conditions and general upgrading of informal settlements.

These policy documents also establish the fundamental principle that the responsibility for this upgrading and reform process should be decentralised to the local government level. Decentralisation refers to the process whereby provincial and local government structures are given increased authority by the central offices of the national government, so that decisions can be made at the level where there is closer contact with the potential beneficiaries of the land tenure reform and upgrading programmes (South African Government: 1997b: 98). Therefore, local government should, as two of their objectives, promote safe and healthy living conditions, and ensure the provision of services to its communities in a sustainable manner (South African Government: 1996a: 63). In general, local government should work together with the community to determine ways in which the community can meet their needs and improve their quality of living in a sustainable manner (South African Government: 1998a.: 37).

The government's legislation and policy documents therefore clearly establish the policy that informal settlements are to be upgraded for the purpose of improving the living conditions in them, and that local

government should play a central role in this upgrading process. I will argue, therefore, that the local government structure should implement and manage an appropriate land records system in order to manage the informal settlements, and its obligations regarding land issues, in its area of jurisdiction.

A common problem globally in land tenure reform is that there is insufficient information relating to what exists on the ground, land uses, and land tenure details, before the upgrading process begins (South African Government: 1997b: 106). In terms of the Bill of Rights contained in Chapter 2 of the Constitution, everyone has the right of access to information held by the State or any other person, which could facilitate the exercising or protection of any rights defined (South African Government: 1996a: 14). The White Paper on South African Land Policy (1997) identifies two of the specific needs for the land tenure reform process as being a reliable and cost-effective system of recording land rights which can record, firstly, land rights that are established in the process of land tenure reform, and secondly, the rights of those who are entitled to use and occupy land which is held on a communal basis (*ibid.*: 107). I argue that these policies both reinforce the need for the local government body, which is the authority closest to the people, to establish a suitable land records system to facilitate the land delivery, land tenure reform, and upgrading programmes, and to make this information available to any person.

2.1.2 The Processes Involved in Upgrading

In the following sections I will deal separately with each of the four processes, which are a major focus of this dissertation and constitute the entire upgrading process for informal settlements. These processes are land delivery, land tenure reform, provision of services, and cost recovery. I shall further discuss the government's policies on these issues, with the ultimate aim of showing how they affect the design of the land records system. I shall refer to the above recent piece of legislation and White Papers, as well as some other earlier legislation on these issues.

Firstly, I will discuss the land delivery process as it relates to government policy. I shall show that it is government policy that all people in the country must have access to land, and that the inequalities of the past discriminatory policies relating to the distribution of land and to their rights in land, must be addressed.

Secondly, I will discuss land tenure reform and show that it comprises two main issues; the upgrading of existing land rights, and the development of innovative new land tenure models for the upgrading and creation of new land rights in the future. I will show that if one is considering the development of innovative new land tenure models for the GEA (as well as in South Africa, in general), ways have to be found to accommodate communal tenure and/or upgradable titles into the formal tenure system.

Regarding the third process of the physical upgrading of informal settlements by the provision of services, I will show that the local government structure has certain social responsibilities related to land issues and servicing towards its residents. In terms of the Constitution and the White Paper on Local Government, I will show that local government is identified as the body which is responsible for improving the standard of living and for the provision of services within its area of jurisdiction.

Finally, referring to the fourth process of cost recovery, I will show that the reform and upgrading policies of the government require that the first three processes above are implemented in a sustainable manner and at an appropriate and affordable level for the consumers they are intended to serve. I shall briefly discuss the government's *Masakhane* Campaign which deals with sustainability and cost recovery.

I will conclude the chapter by extracting from the combination of all the government's land tenure reform and upgrading policies and legislation discussed, the overall implications on the design of the land records system.

2.2 Land Delivery

I will discuss to what extent the government's major policies on the upgrading of informal settlements impact upon the land delivery process, and will evaluate how these policies may influence the design criteria of the land records system for the management of the information and the upgrading process.

All three policy documents referred to above deal with the land delivery process and the basic rights of all citizens to land and a place to live. Firstly, the Constitution of the Republic of South Africa (Act No.

108 of 1996) instructs that the government "must . . . foster conditions which enable citizens to gain access to land on an equitable basis", and further that no one may be deprived of property (which includes land but is not limited to it), except by legal means (South African Government: 1996a: 11). The White Paper on South African Land Policy (1997) also states, in its main strategic goals, that land must be more equitably distributed than in the past, and there must be security of tenure for all, together with a rapid release of land for development (South African Government: 1997b: 7). The White Paper on Local Government (1998) establishes the basis for local government to transform itself into a more developmental role to face the challenges of transforming settlement patterns, and for spatial integration of land and land uses within its area of jurisdiction (South African Government: 1998a.:15-16, 177). This is clearly related to the delivery of land for settlement and establishes, along with the other documents referred to above, the government's policy on this issue. The land delivery process is a necessary forerunner to the other processes of land tenure reform and the provision of services in a sustainable manner, both of which require land initially.

A vital aspect of any land delivery process is planning. *Apartheid* planning left behind a spatially separated pattern of development in cities and towns, and this is also evident in the Pietermaritzburg and Greater Edendale parts of the TLC Area, as described in Chapter Four below in some detail. Spatial integration of the whole area, which will increase the efficiencies of operation within the TLC Area and reduce transport costs, is essential. Planning for environmental sustainability should be an integral part of the planning process, involving both the upgrading of existing areas, and the establishment of new areas and developments (South African Government: 1998a.: 44). The provision of basic services to households is also local government's responsibility, and is a constitutional right for the people (*ibid.*: 43).

Integrated Development Planning (IDP) is a process through which local government can establish a development plan which will accomplish the above objectives. It involves working closely with the communities to establish their needs, setting priorities, formulating strategies to achieve the key goals set, and monitoring progress (*ibid.*: 47).

I will show later that one of the reasons for the invasion of land is the inability of the formal land delivery system to make land available for development purposes to cope with the demand. Under the existing

formal systems and legislation land delivery can not be achieved quickly enough, and this results in the informal land delivery system taking over, and the development of informal settlements.

In order to facilitate the rapid release of land for development the government promulgated the Development Facilitation Act (Act No. 67 of 1995) (DFA), which establishes a system to speed up the development process in South Africa. In addition to speeding up the actual process of development approvals by streamlining the processes, it also makes provision for a new form of temporary tenure, known as "initial ownership", which enables people to obtain ownership of a property before all the usual land development steps have been completed (South African Government: 1995: 72-74). This is done through a special deed of transfer and a system of guarantees from the land delivery professionals, being the land surveyor and the conveyancer. The initial ownership is intended as a fast-track temporary mechanism to allow people to occupy land and access subsidies and loans at an earlier stage, and must eventually be converted to full ownership once all the necessary processes have been completed (*loc.cit.*).

The White Paper on South African Land Policy deals in depth with the issues of the redistribution of land and land restitution as two possible methods of land delivery (South African Government: 1997b: 7-12), however, I will not discuss these methods any further in this dissertation. Instead I will focus on another issue raised in the White Paper, namely the issue of state and public land, currently owned by national, provincial or local government bodies, which is not being put to optimal use. The White Paper on South African Land Policy states that this land should be made available for redistribution, and to facilitate the land delivery process for sustainable development (*ibid.*: 83-84).

I have shown that land delivery in its various forms is part of the government's policies and is the first step and a necessary part of the upgrading process. It is also a preventive measure, as rapid formal land delivery will pre-empt the informal land delivery system which usually results in informal settlements.

The impacts of the information requirements of the land delivery process on the design of the land records systems are drawn together here. The land delivery process includes, as its major component, the planning of the area. As the planning process should facilitate sustainable development as well as environmental sustainability, the land records system should be able to identify areas suitable for development, and those which are not, as well as environmentally sensitive areas or features which

require protection or conservation. In addition, planning requires information of the existing land rights, but this requirement will be fine-tuned by the requirements for the land tenure reform process which follows. Furthermore, the planning and land delivery processes require information regarding what exists on the ground. Detailed aerial mapping showing existing physical features and attributes, such as roads, rivers, buildings, settlements, and contours or some other indication of the 'lie of the land' is required for this purpose.

The land records system should clearly be able to accommodate all this information in separate levels so that users can switch on those levels of information to be viewed and switch off those not required. Finally, as the land delivery process invariably sets off the other upgrading processes of land tenure reform and the installation of services, the land records system should be flexible and easily updatable so that any information updates, such as the results of an upgrading exercise, can be put into the system to facilitate ongoing planning and maintenance, without causing problems in the system. The other aspects of the upgrading process are discussed below.

2.3 Land Tenure Reform

2.3.1 Introduction

I shall discuss the two aspects of the government's land tenure reform policies, namely the upgrading of existing land rights in some cases, and the development of innovative new land tenure models, both for upgrading existing land rights, and for new land rights in the future. In doing so, I will firstly extract the government's main policies on the subject from the Constitution and White Papers referred to above, as well as some others, and I will show that the government is committed to land tenure reform. I will show that if one is considering the development of innovative new land tenure models for the GEA (as well as in South Africa, in general), ways have to be investigated to accommodate communal tenure and/or upgradable titles into the formal system. I will then describe the main principles of these two possible land tenure reform models, being the communal tenure model and a proposed system of upgradable individual titles, and will argue the need to incorporate these into land tenure reform models.

Thereafter I will discuss the Communal Property Associations Act (No. 28 of 1996), which offers a potential solution to the land tenure reform process in that it makes provision for the incorporation of communal land tenure into the formal so-called 'superior' cadastral and registration systems.

I shall conclude this section by identifying the impact of tenure reform on the design of the land records system for the management of informal settlements, and to facilitate the land tenure reform and upgrading process.

2.3.2 Land Tenure Reform Policies

I begin by identifying the government's land tenure reform policies contained in the Constitution and the White Paper on South African Land Policy (1997), as well as from some other legislation.

The three fundamental aims of the government's land tenure reform initiative are to extend security of tenure to all South Africans (South African Government: 1997b: 7), to upgrade land tenure which is insecure in law as a result of past racially discriminatory laws or practices (South African Government: 1996a: 11), and to develop a variety of diverse new forms of tenure which reflect the tenure arrangements on the ground and which are more appropriate for the circumstances of the people (South African Government: 1997b: 60). The upgrading aim referred to includes the eradication of inferior titles, by upgrading existing such titles and by not registering any further inferior titles. These inferior titles in the GEA will be discussed below (and in more detail in Chapter Four).

The main guiding principles of the tenure reform programme, as contained in the White Paper on South African Land Policy, are: firstly, to recognise unrecorded land rights and to transform these, and those based on permits, to legally enforceable land rights; secondly, to recognise and support the development of a variety of flexible and diverse systems of land rights within a single (non-racial) framework, including both "group based and individually based ownership systems", from which options the people may choose (South African Government: 1997b: 60); thirdly, to ensure that any system devised is consistent with the commitment to basic human rights contained in the Constitution in its delivery of equality and due process to those involved; and finally, to bring new tenure systems and laws into line with reality as it exists on the ground and in practice, by the recognition, again, of the *de facto* systems of vested rights in land as a starting point (*ibid.*: 61). The White Paper mentions that "adjudicatory

principles" are being developed to identify and quantify current interests in land (*loc.cit.*). I will show that, in order to facilitate the adjudication process of determining the rightful owner, the trail of legal evidence of these interests in land should be established and recorded in the land records system. Although some of these principles are aimed at the rural situation, they have relevance to the urban situation as well, and it is in relation to the urban situation, and in particular as the responsibility of the local authority due to the decentralisation policy of the government, which they will be discussed.

There are two other fairly recent pieces of land tenure reform legislation which I will describe below: the Upgrading of Land Tenure Rights Act (No. 112 of 1991), which deals with aspects of the upgrading of existing land rights; and the Communal Property Associations Act (No. 28 of 1996), which gives a potential solution to the problem of incorporating communal tenure into the formal or freehold cadastral and registration systems.

Therefore, as I have shown, the government's land tenure reform policies include the upgrading of all existing unrecorded or recorded inferior land rights, and the development of innovative new land tenure models for the upgraded and new land rights created. In addition, these new tenure models should be varied and diverse, and should reflect and formalise the situation on the ground, including the informal land holdings, while at the same time taking cognisance of the choice of tenure system of the people living there. Although they are quite closely linked, I will deal with the two different aspects of the land tenure reform policies referred to above separately, namely the upgrading of land tenure rights, and the development of new land tenure models.

2.3.3 The Upgrading of Land Tenure Rights

The upgrading of existing land tenure rights and informal land holdings is one of the government's land tenure reform policies, and as this responsibility has been decentralised to the local government level, the local authority needs to establish an appropriate land records system in order to manage the information required and the processes involved. As I will show in Chapter Four, there are large areas of the Greater Edendale Area which have recorded inferior titles, and even larger areas covered by informal settlements with their residents having no formal land tenure rights, and these need to be upgraded in accordance with this policy. As I will show below, the process for upgrading the recorded inferior titles is different from that relating to unrecorded *de facto* land tenure and informal land holdings.

The White Paper on South African Land Policy gives guidance as to how the upgrading of existing land rights should be implemented, and the "key tasks" which are necessary in order to accomplish the aims and deliver security of tenure in diverse ways (South African Government: 1997b: 64). These key tasks would apply equally to the two separate types of existing land rights referred to above. Firstly, careful adjudication has to be carried out to ensure that all rights in land are protected, especially where there are overlapping rights in land - *de facto* vested rights in (conventional) urban informal settlements are an example of these overlapping land rights. Secondly, where informal land rights exist on privately owned land the rights of the "current owners" (which includes the registered owner, but also any other people who have lived on the land for, perhaps, generations, and have established the right to stay) are to be protected (*loc.cit.*). Finally, as already mentioned above, all land which is dealt with under the land tenure reform programme should be registered in one or another form of ownership, either as individual ownership, or as group ownership, for example, as provided for in terms of the Communal Property Associations Act (No. 28 of 1996). Another form of registration which is being further investigated, that is family-based ownership, may be another option (*ibid.*: 65-66). The contents and implications of the Communal Property Associations Act will be discussed in more detail later in this chapter.

Regarding the upgrading of inferior land tenure rights, there is one specific piece of legislation, the Upgrading of Land Tenure Rights Act (No. 112 of 1991) (ULTRA Act), which deals exclusively with this subject, and I shall briefly discuss it and describe its contents. For the purpose of determining the process to be followed it classifies different types of inferior land rights differently, and indicates the upgrading process for each type of land right. Schedule 1 rights are the strongest of these, for example deeds of grant or rights of leasehold (99 years), and in terms of the Act, are automatically upgradable to freehold ownership by the Registrar of Deeds once the township register has been opened (Pienaar: 1996: 28-29). Schedule 2 rights are weaker rights, such as permissions to occupy or various rights of occupation issued in terms of certain listed pieces of legislation, and in terms of the ULTRA Act are upgradable to full ownership rights in accordance with the process laid down in the ULTRA Amendment Act (No. 34 of 1996)(South African Government: 1996c: 4-5). In terms of the ULTRA Act the upgrading process for Schedule 2 rights is instituted at the instance of the registered land owner (*op.cit.*; South African Government: 1991: 6).

The implications of the ULTRA Act on the design of the land records system are that, in addition to the system recording and showing the physical extent and description of the inferior land tenure rights, the system should also be able to record whether each existing land right falls under the definition of a Schedule 1 or Schedule 2 right. This would facilitate the management of the upgrading process by indicating the appropriate process to be followed to upgrade a particular land right.

Although conventional urban informal settlements will be discussed at length from the Greater Edendale point of view in Chapter Five below, the specific reference made by the White Paper on South African Land Policy (1997) to urban informal settlements and their *de facto* land tenure reflects the government's official thinking on this issue and therefore deserves further mention. The White Paper refers to the fact that many people have lived in informal settlements for years and their *de facto* land tenure on the ground have thereby become established as vested rights in the land. These rights exist on the ground but have not been legally confirmed. The people are therefore vulnerable to exploitation until such time as their land rights are "brought within the ambit of the law and functional land administration systems" (*ibid.*: 33).

I have shown that in order to accomplish this, the existing land rights, inevitably at least two sets of overlapping land rights, need to be identified and recorded. The trail of legal evidence of land tenure should be established to support the conversion to vested land rights. This trail of legal evidence, being a record of any evidence of sustained occupation of the land over time, such as aerial photographs, records of a service supply organisation, agreements with land owners, or verbal/public witness evidence, should be recorded in the land records system, as it will be needed during the adjudication process. If the adjudication process identifies the informal land rights as the dominant land rights, a process of upgrading the land tenure rights would follow, with the community having a choice from a diverse range of possible land tenure systems, for the land tenure model which will best suit their needs and circumstances.

I have shown that an appropriate land records system would record these overlapping land rights as well as the trail of legal evidence of land tenure, and would facilitate the land management and land tenure reform processes, including the adjudication process and the conversion to the new land tenure system

implemented. Because of the government's decentralisation policy discussed above, it would clearly be the local authority's responsibility to develop and maintain such a system.

I conclude that, in order for the local authority to implement these land tenure reform measures referred to, and to successfully deal with its new responsibilities due to the decentralisation policy referred to in the White Paper on South African Land Policy, the local government structure should set up and manage an appropriate land records system to provide the necessary information for decision-making, and to facilitate the land tenure reform process.

The implications of the above on the design of an appropriate land records system, which is established for informal settlements, are that it should record all the initial existing land rights as they exist on the ground, both recorded inferior titles and permit-based land rights, as well as any unrecorded *de facto* land tenure or informal land holdings, and any other evidence of interests in the land over time, to facilitate the adjudication process. The land records system should also assist in the two separate processes for the transformation of these tenures to real rights in law, namely the upgrading of the recorded inferior titles in terms of the ULTRA Act, and the conversion of the unrecorded *de facto* land tenure and informal land holdings, to registered land rights. Finally, the land records system should record the upgrading process from the initial informal land tenure rights to the final new land tenure model put in place after upgrading.

The following sub-section deals with establishing new forms of tenure which can be used in the upgrading process, and could apply to the upgrading of these informal land rights, both recorded and unrecorded, and the unrecorded informal land holdings referred to above.

2.3.4 New Land Tenure Reform Models

The government is committed to land tenure reform measures which will address the inequalities of the past regarding restricted access to land for Blacks, and formalise any recorded or unrecorded informal land rights and unrecorded informal land holdings which may already exist. I am arguing that this includes formulating tenure reform models which will incorporate innovative ideas, possibly drawn from other land tenure models. The White Paper on South African Land Policy, in its guiding principles of the land tenure reform programme, states that a variety of flexible and diverse systems of land rights

must be developed, from which options the people may choose. These systems should be within a single framework (South African Government: 1997b: 60). Two examples which have been mentioned, both in the government's White Paper on South African Land Policy (1997), and by experts researching the subject, are a group or communal-based land tenure system, and a system of upgradable individually based titles (*loc.cit.*). I am therefore arguing that, for the GEA, aspects of each of communal tenure systems and upgradable individual titles should be incorporated into the formal cadastral and registration systems to create new tenure systems which will better suit the needs and circumstances of a large portion of the population there. As a further guide, the White Paper states that any system devised should aim to align with the situation as it exists on the ground, and must further be in accordance with the commitment to basic human rights contained in the Constitution of the country (*ibid.*: 60-61).

The unrecorded *de facto* system of land tenure in conventional informal settlements is not satisfactory, as it does not provide security of tenure, and does not facilitate the upgrading of the settlements in regard to service delivery. However, where land rights have been established these should be recognised and used as the starting point, with the ultimate aim of being incorporated into the new land tenure system (*ibid.*: 60).

Several experts believe that it is very likely that some form of communal or group tenure will be incorporated into the land tenure reform proposals (Cross: 1996: 2; Dlamini: 1990: 37). Regarding individual title, a probable form of tenure reform model which will be considered is that of upgradable individual title, where at the lower end of the scale, title to land is given via a cheap and quick method, without the need for the expensive services of property rights professionals. The limited rights acquired in terms of such title are sufficient for the land holder's purposes at the time, and there is the immediate advantage that he or she will not have to pay for the additional features of a superior title which are superfluous to his or her needs at that stage. The land holder can then upgrade the title to full freehold title, possibly through an intermediate step, as and when his or her circumstances require it (Alberts *et.al.*: 1995).

These two aspects of probable land tenure reform measures will be investigated briefly below to identify the implications that they would have on the design of a land records system to manage the information and processes involved in the upgrading of informal settlements.

2.3.4.1 Communal Tenure

As mentioned above, the government's White Paper on South African Land Policy (1997), encourages a range of various forms of land tenure, and states that people should be able to choose the land tenure system under which they would prefer to hold their land rights. In deciding on land tenure reform models which meet the fundamental requirements and which could be implemented, one of the main decisions which has to be made is on the fundamental principles which will apply to the tenure models to be offered - individual tenure or communal tenure? I will first discuss communal tenure in this sub-section, with particular reference to the Zulu customary land tenure model, with the aim of showing that certain aspects of this land tenure model should be incorporated into the formal freehold system.

Customary law was previously ignored and negative attitudes were created towards it under *apartheid* (Dlamini: 1990: 37). Individual title has previously been regarded as the only avenue towards tenure security and an acceptable land tenure reform model (Latsky: 1990: 288; Cross: 1996), but this should not be so; "communal (including customary) tenure" should be available as an option (Latsky: 1990: 293), and various forms of communal title could "serve to protect households against 'middle class raiding' and the market incentive to dispose of family shelter for short term gain" (*ibid.*: 288). These fears of middle class raiding and disposing of the family shelter for short term gain mentioned above have turned out to be very real possibilities, and there is evidence of such occurrences in the GEA (Greene, personal discussion: July 1998).

Communal tenure is almost certainly going to be part of "the future for the disadvantaged areas" as poor communities need access to land, but are usually unable to use private tenure because of the costs of the formal system (Cross: 1996: 2). Legal tenure systems have to be accessible to be sustainable, and Cross argues that the freehold registration system in South Africa is neither (*loc.cit.*). On the other hand, the communal tenure system is the form of land holding and transfer system which is found in disadvantaged communities (*ibid.*: 8), and has been used by the people for centuries.

The communal tenure system is more than just a system dealing solely with land issues; it also has strong social advantages, as a person can hold land rights in an area only if he or she is a member of the community there. With community membership and land rights come the benefits and obligations

associated with membership of the community (*loc.cit.*). For poor people, and people whose customs are based on this communal way of living, these considerations are extremely important for survival.

There are, however, problems with incorporating customary land law into the South African system which is based on Roman-Dutch law, as there are fundamental concepts, such as ownership of land, to which customary land tenure concepts cannot relate (Dlamini: 1990: 37-40). Ownership implies "an element of individualism which is foreign to customary land rights" and "in customary law, land is either not owned at all or owned by a tribe or a smaller social unit as a whole, while individuals have protected rights to occupy, use and exploit certain portions of the land within the social and authority structure of the group" (*ibid.*: 40). Customary land tenure should be understood in the context of the extended family, which underpins the "social solidarity" and the resultant "community land ethic" (*ibid.*: 41).

According to Cross, contrary to popular belief, communal tenure does provide "secure, inheritable individual family landholdings, and does not imply sharing resources other than those collected from the natural environment" (Cross: 1996: 8). Communal tenure systems have become very adaptable and flexible, and respond easily to changes in people's needs (Cross: 1996: 9; Dlamini: 1990: 42; Fourie: 1998a: 16-17). As situations change, for example the kinds of transfers which need to be effected, the requirements are fed back into the tenure rules and these are adapted to suit the demand. Systems can therefore develop independently and local differences become evident, but generally the more popular changes are made to the communal tenure system as a whole in a relatively short space of time. As an example, consider the issue of the transfer of rights in land under a communal tenure system. In the older forms of communal tenure a land transaction required multiple approvals from a number of stakeholders within the community, and it could result in the process taking years, or even in preventing the land holder from disposing of the land (*ibid.*: 8-9). In the most modern urban communal systems this process has been reduced to "a quick interview with neighbours" (*ibid.*: 9). In addition, communal systems can now allow almost full autonomy to the person holding the land rights, "including the right to sell to outsiders" (*loc.cit.*). This further supports my argument in Chapter Five below that the levels of the pyramiding over-rights are reducing in the adapted version of the Zulu customary tenure system found in modern urban informal settlements.

Cross (1996) emphasises that the key factors to bear in mind when developing a tenure system appropriate for urban (and rural) poor, are poverty and accessibility. The tenure system should be able

to operate and be sustainable "without needing resources the disadvantaged do not have, and without users needing to go outside their community" (*ibid.*: 10). Cross argues that a communal tenure system would meet these requirements, whereas the "formal private tenure" system does not. In addition, experience has shown that, in areas where communal culture is dominant, the freehold cadastral and registration system has "inevitably (been) transformed into a version of communal tenure almost everywhere it has been instituted" (*loc.cit.*). My observations on the ground, in the upgrading of the Site 11 and Glenwood Two informal settlements in the PMTLC area, confirm that almost all the people in the settlement are very poor, and many of the principles of the adapted urban form of the Zulu land tenure system, as discussed below (see Chapter Five), have been reinstated within a short space of time after the formalisation and upgrading exercise. This observation also lends credibility and respect to the concept of upgradable titles to be discussed in the next sub-section below, which I will argue, also meet many of the above requirements.

From the discussions above it would seem likely that, in addition to already being in place in many conventional informal settlements in the GEA, a communal tenure system, in the form of the adapted urban version of the Zulu customary land tenure system (see Chapter Five) should form part of the land tenure reform measures which will be instituted in this country. The implications on the design of the land records system are that the system being proposed for urban and peri-urban informal settlements in the GEA, should be able to deal with the land rights and records pertaining to the adapted form of the Zulu customary land tenure system, and should provide the necessary back up for a land tenure reform model which incorporates certain aspects of that tenure system. The requirements of the land records system to accommodate the Zulu customary land tenure system will be dealt with below in Chapter Five, after that tenure system has been discussed in detail. However, two aspects mentioned by Cross above which will not be dealt with in Chapter Five, are, firstly, that the system should be sustainable and operational without the need for resources which disadvantaged people do not have, and secondly, that the users should be able to access the system within their community. These two requirements are noted here as a design requirement for the land records system, but will be discussed in more detail later.

2.3.4.2 Upgradable Individual Titles

I will now discuss the features of a system of upgradable individual titles. This is being discussed as certain residents of informal settlements may wish to hold their land by individual tenure, but may not

be in a position to access the formal freehold tenure system due to its high costs and inaccessibility (Cross: 1996). In addition, the concept of registration of ownership of land in terms of the formal cadastral and registration system may prove to be too foreign, too costly, and too inaccessible for the majority of informal settlers. In such cases I argue that an upgradable form of individual title would be appropriate, as it would provide the land holder with an entry-level form of individual title on the land, with limited rights in the land (but sufficient for his/her current needs). I would even argue that, at this entry level, a tenancy arrangement with the landowner (which should almost invariably be the local authority), should be sufficient, until the tenant demonstrates that he or she is a permanent resident, and requires permanent title to the land. This title could then be upgraded when the land holder's needs or wishes demand it, and when he or she can afford to do so. I argue that such upgradable titles should also be accommodated in the land records system, which should in turn be updated to reflect the process of upgrading as and when it occurs.

Latsky (1990), Alberts *et.al.* (1995), and Fourie (1998) all propose such an alternative land tenure reform model in the form of a new land registration system, based on individual freehold title, but which includes a "staged tenure in the first generation of title registration" (Latsky: 1990: 292). This "first generation of title registration" is to be created in the interests of achieving cost reduction, simplicity and speed relating to the registration procedure, and should be completely upgradable to full freehold title (*loc.cit.*). Once again, my argument for a tenancy arrangement at this lowest level would also fulfill the objectives referred to above. The details of properties held under the upgradable form of title should be kept in the land records system, to reflect the level of registration of the upgradable title at which it exists at any point in time. This will facilitate the planning for a title upgrading programme.

The criteria in the proposal by Latsky (1990) and Alberts *et.al.* (1995) for first generation registration of title are that the land is identifiable on the ground as an appropriately authorised future erf, and the beneficiary in whose name the erf is to be registered is "described with absolute accuracy", through some form of identification technology (Latsky: 1990: 298-299). This means that the land delivery process has been completed, as the layout plan has been drawn and approved by the appropriate authority and the future erven have been pegged by a land surveyor, although the general plan may not yet have been completed and submitted to the Surveyor General. Identification of the beneficiary, similarly, does not necessarily mean identification with reference to standard identification documents, but would include

any method of identification with the assistance of identification technology, provided that absolute accuracy of identity is achieved (*ibid.*: 298-299). For the upgrading of the registration to full freehold title on application, the official cadastral description and an approved general plan must be available, and the township register will be opened. The usual identification indicators, namely full names, date of birth and identity number, of each beneficiary are required, and the application must comply with all traditional requirements in property law (*loc.cit.*).

Fourie (1998) also examines land tenure reform and urban land delivery by upgradable titles, and points out that in addition to the formal forms of subdivision, and dealings in land such as transfers, inheritance, and first titling of vacant land, there are also informal forms of these processes (*ibid.*: 2). She argues that the approach adopted by the United Nations Centre for Human Settlements (UNCHS), namely that informal settlements and processes should be seen as assets and not liabilities, should be adopted. If this becomes the guiding philosophy, then the object would be to somehow integrate the informal forms and the formal forms of these processes - in fact, Fourie argues that such integration is crucial both to urban management and security of tenure for the poor (*ibid.*: 2-3). Fourie proposes two additional types, or levels, of titles, namely "starter" and "landhold" titles, both of which are upgradable to the next higher level (*ibid.*: 14).

"Starter" title would be given in respect of sites within a block consisting of a number of families (between 40 and 100). The outside boundaries of the block would be formally surveyed and registered in freehold ownership, probably in the name of the local authority or an NGO, and the "starter" titles of sites within the block would be recorded "at the local property office" (*ibid.*: 15). Within the ambit of this dissertation, and referring to the GEA, the "local property office" could well be the land survey branch of the PMTLC, and the "starter" titles could be recorded in the land records system housed in that office. The internal boundaries would not be surveyed or registered. The "starter" title would provide the holder with certain limited rights, entitling the holder to perpetual occupation of a site within the block, and the right to dispose of his or her rights (*ibid.*: 14).

By upgrading to "landhold" title, the holder would acquire a title with the most important aspects of freehold title, but still in a more simplified and cheaper form (*ibid.*: 15). This title would be in respect of a specific defined site, and would, in addition to providing the owner with the right to occupy that site

in perpetuity, also allow him or her to mortgage the site, or dispose of it (*loc.cit.*). This title would be recorded in the local land records system, and it would not be necessary to use property lawyers to register these rights, as the range of possible transactions would be limited and the land records staff would be trained to process these transactions (*loc.cit.*). Similarly, it is suggested that survey technicians could survey the sites to a lower cost and standard of accuracy, instead of a professional land surveyor having to perform the survey in terms of the Land Survey Act (1997) (*ibid.*: 16).

A final method of upgradable individual title which I will discuss is the so-called 'mid-point method' (Jackson: 1996). This method also provides a cost effective and quick method of passing individual title, and similar to the starter titles discussed above, is particularly suited to (conventional) informal settlements where the outer boundaries of the community or block are established, but the internal boundaries between individual informal tenures are unrecorded and "relatively fluid" (*op.cit.*: 280). It allows for the positions of individual tenure rights to be recorded without recording their boundaries, the tenure right being represented by a single point typically just outside the front door of the house or shack. This avoids the rigorous and lengthy adjudication process associated with fixed boundaries (*op.cit.*: 277-284). It also avoids having to hastily plan and demarcate the positions of roads and service corridors between individual tenure rights, which in many cases prove to be unsustainable (*loc.cit.*). Furthermore, the method is flexible enough that after the so-called 'mid-points' have been surveyed and recorded, new rights can be created between the existing ones, or existing rights can be abandoned, as the internal rights have no fixed boundaries so can adjust to accommodate an extra right, or take up extra land as a result of an abandoned right (*op.cit.*:280).

The mid-point method is cheap and relatively easy to maintain with assistance from (trained) members of the community and a land records system at the local government level (*op.cit*: 281). Such a system is fully upgradable to freehold title, once all the rights holders within the community or block have agreed to the positions of the boundaries of the individual land rights and the public or communal thoroughfares, and these have been surveyed as fixed boundaries (*loc.cit.*).

I have shown that there are several similar proposals for upgradable titles to be implemented as a possible land tenure reform model. Upgradable titles are, in essence, individual titles, as opposed to communal tenure, and as such will be preferred by certain sections of the population. There are not many

additional implications for the design of the land records system to be created to manage the upgrading process, as most of the requirements are similar to those for the formal cadastral records or the inferior titles referred to above. The land records system should record which level of the upgradable title is current for each property or group of properties.

The entry-level "starter" title suggested by Fourie, for example, does not relate to a surveyed and defined property as in the proposals by Latsky (1990) and Alberts *et.al.* (1995) described above, but refers to a site within a block. The mid-point method (Jackson: 1996) relates to a co-ordinated point within the individual tenure right on the ground, and not to a demarcated site. Whichever method is chosen, the records system should show each tenure right, and record the identity of the holder of the right as well as the details of the right, including the level of tenure in existence. It should also be able to facilitate any subsequent transfers if the official records are to be held at the local level as suggested by Fourie (1998a). In such a case the local authority would become the "local property office" referred to above, and the land records system would become the official local record of these land rights (*ibid.*: 14).

To conclude, the staged or upgradable tenure system should also be accommodated in the land records system. As the right and the land holder will be identifiable, similar to the freehold and inferior titles, the impact on the design of the land records system should not be great. The land records system would in any event have to accommodate the freehold cadastral and registration system records to show the freehold land rights which exist, and also any inferior land rights, some of which will be based on the cadastral system and others not. For those unrecorded land tenures and informal land holdings which are not parcel-based and do not follow any formal cadastral boundaries, such as *de facto* land tenure and "starter" titles, they would have to be mapped in some appropriate way, so that their limits can be defined in the records system. This aspect is discussed in more detail in Chapter Five when informal settlements are discussed further. If the mid-point method of recording individual informal tenure within a surveyed outside figure is used, then only the co-ordinates of the so-called 'mid-point' of each right need be determined and recorded. When recording information relating to an existing settlement before upgrading commences, the type of tenure system in place in each settlement should also be determined and recorded, together with, I argue, the preferences of the community, to assist with the decision-making for the appropriate tenure reform model for that settlement.

Regarding the incorporation of communal tenure into the formal freehold cadastral and registration systems, there is a further specific piece of land tenure reform legislation which deals exclusively with that subject. The Communal Property Associations Act (No. 28 of 1996) provides for such a land tenure reform solution, and this will be discussed in the next sub-section.

2.3.5 The Communal Property Associations Act (No. 28 of 1996)

I will briefly discuss the Communal Property Associations Act (No. 28 of 1996) as a possible land tenure reform model which could be used to upgrade a settlement and to provide security of tenure, and I will investigate the implications of such a tenure reform model on the design of the land records system.

This Act makes provision for previously disadvantaged communities to form "communal property associations" as juristic persons to acquire and manage property as a group (South African Government: 1996b: 2). The Act formalises the arrangements within the community by providing for the community (which has to be approved by the Minister of Land Affairs) to be registered as an association in terms of the Act and for a constitution to be drawn up with the assistance of the Department of Land Affairs for the main object of holding property in common ownership (*ibid.*: 2-8). The terms of the association's constitution, which is required to set out the rules for access to, and management of, the land owned jointly by the group in accordance with certain basic principles set out in the Act, should also reflect the group's values and culture, and be appropriate for the group's circumstances. From the discussions above, the group's values and culture may be influenced by the Zulu customary land tenure system, but there may be other influences, and the constitution of the group should reflect these. The constitution, once registered, is attached to the title deed of the property (*ibid.*: 8-12; South African Government: 1997b: 63).

The Communal Property Associations Act (No. 28 of 1996) makes provision for the upgrading of the land tenure of a community or settlement through "a relatively simple and accessible mechanism" (South African Government: 1997b: 63), formalising the communal land tenure arrangements in place in the community and incorporating them into the formal cadastral and registration systems. The result is very similar to the voluntary associations, share-block schemes, sectional titles and trusts used by more experienced and more affluent groups of people in the past to own and manage property as a group, but

these arrangements are generally not appropriate and their administration too complex, expensive and inaccessible for the less-affluent sectors of the population (*op.cit.*).

The White Paper on South African Land Policy, in discussing group titles, identifies some issues which early implementation experience shows require attention and possible amendment of the Act. For example, there is already a need for the Act to allow for internal subdivision and registration of individual titles within the communal property association boundaries (South African Government: 1997b: 66). There is also research being done on an adaptation to a form of family ownership.

The implications for the design of the land records system are that the system should record information on the formal cadastral and registration systems, as well as the internal arrangements within the communal property association's boundaries, which are at present not part of the formal system. This would entail mapping the limits of occupation by each household within the communal property association boundaries by some appropriate method, as there would not, as the law now stands, be any parcel boundaries to identify these internal land rights.

2.3.6 Conclusions

I have shown that the government is committed to land tenure reform, both the upgrading of inferior titles, as well as land rights based on permits, unrecorded *de facto* land tenure, and informal land holdings. This responsibility has been decentralised to the local government level, and in order to manage the process and the information required, an appropriate land records system is to be established and managed at the local government level.

The implications of the land tenure reform measures referred to above on the design of the land records system are that the system should record the underlying existing cadastral land rights and inferior land rights, all of which are parcel-based, in the first instance. It should also record the non-parcel-based land rights, such as *de facto* land tenure, rights based on permits, and informal land holdings. This will facilitate the adjudication process. The records system should also be able to record the "current owners" (South African Government: 1997b: 64) on privately owned property such as the tenants (see Chapter Five below) and the preferences of all people who require land tenure reform as to the type of land tenure option which they prefer. In cases where the ULTRA Act is used to upgrade inferior titles, the system

should record whether the existing land rights fall under Schedule 1 or Schedule 2 rights in terms of that Act.

I have shown that the land records system should also show the reformed tenure rights after the land tenure reform process, which may include the adapted urban form of the Zulu customary land tenure model, upgradable individual rights, or communal/group titles within a fixed outside figure. Some of these are parcel-based, but others are not and should be identified and shown with the aid of some suitable mapping process, or by the mid-point system. The land records system, by implication, would also have to be flexible to trace the process of land tenure reform and to record the changes made.

The land records system should also be able to show services, as these may affect the establishment of land tenure rights. Service delivery will be discussed in more detail in the following section.

2.4 Provision of Services

The White Paper on Local Government specifies that local government must be responsible for the provision of services in its area of jurisdiction. In addition, in terms of the Constitution and the White Paper on Local Government, all citizens must have access to at least a minimum level of services, and the provision of these services in a sustainable manner is clearly identified to be the responsibility of the local government structures (South African Government: 1996a: 63; South African Government: 1998a.: 42).

The implications of these government policies are that the local government structures should evaluate the situations regarding services in their areas of jurisdiction, and should plan for installation of services in their informal settlement areas. In the GEA there are many parts without adequate services.

Referring to Maps #7 and #8 (in Appendix A), the PMTLC has collected information regarding the availability of water and sewerage in the GEA as part of the TLC's *Masakhane* programme (to be discussed in the next section), and this information will be used for planning and upgrading services in the GEA. These maps show the distribution of the various types of water and sewerage systems, and show, for example, that most households in the GEA obtain their water from communal standpipes, and

use pit latrines for the disposal of sewage. The communal water standpipes have significant implications for water wastage, as well as cost recovery. The sewerage map reveals the wide distribution of conservancy tanks which have to be emptied by the PMTLC staff at an unsustainable charge, which also has cost recovery implications. Furthermore, consideration of the two maps together shows the large areas where there is metered water supply or a communal tap, but where no suitable method of disposal of the resulting so-called 'grey water' exists. These maps, and mainly the inclusion of this data in the land records system, will enable the PMTLC to comply with its responsibilities, and to plan and make decisions for the upgrading of these services.

From experience in local government in Pietermaritzburg and the GEA, I argue that it is prudent to complete the planning of the formalisation and upgrading of the settlement before commencing with the installation of services, so that the positions of the individual residential sites, and service and access corridors are finalised before installing services. The services can then be installed in the correct places, rather than possibly having to be relocated at a later stage, at wasted cost and effort. The information on the positions of services will be crucial to the planning of extensions to the existing service networks.

The impact of the provision of services on the design of the land records system is that the system should show firstly, information on the status of services in the area such as the *Masakhane* information shown on Maps #7, #8 and #9. In addition, the land records system should record and show the positions of all the municipal services in existence, with attribute details, such as capacity or consumption, condition, and records of maintenance. The services should ideally be captured from co-ordinates off the as-built plans of each service from when it was constructed, but when these are not available it would be necessary to capture them in relation to the cadastral boundaries or accurate mapping of the features on the ground. The system should also show separately, those service extensions or upgrades planned for the future, with an anticipated date of construction, approximate cost, reference to the Engineer's design drawings, if appropriate, *etc.* (Greatwood, personal communication: June 1999). Finally, the land records system should have a relational spatial database to process queries on spatial relationships involving services data and any other data set.

The final aspect regarding the provision of services referred to in both the Constitution and the White Paper on Local Government is that they should be provided at a sustainable level and should be affordable to the consumers. This points to the *Masakhane* Campaign put in place by the government,

one of the main aims of which is to promote sustainability with regard to services and service provision. This will be discussed in the next section.

2.5 Sustainability and Cost Recovery

I will discuss the process of cost recovery as it relates to the sustainability of the first three processes, namely land delivery, land tenure reform and the provision of services, but mainly service provision. During the days of *apartheid*, rents and service payments were boycotted in protest against the non-democratic government (Lewis: 1995: 67). Local authorities were facing a financial and administrative crisis if this culture of non-payment could not be reversed. The government therefore initiated a campaign aimed to reverse this practice, and to revive local government revenue collection, called *Masakhane*, meaning "let us build together" (Anonymous: 1995:24). This campaign was officially launched by President Mandela at the Marconi Beam informal settlement in Cape Town in February 1995 (*loc.cit.*, Lewis: 1995: 67).

The main aims of the campaign were: firstly, to speed up the delivery of basic services and housing; secondly, to promote the payment of rents, service charges and bond installments; thirdly, to create conditions to encourage large scale investment in housing, services, infrastructure and local economic development; and finally, to create conditions conducive for effective and sustainable local governance (South African Institute for Race Relations: 1996: 341). Some of the main problems which were identified during the campaign were that, firstly, many people were not receiving accounts, secondly, there was no central office where they could make their payments, thirdly, the poor condition of houses and services, and finally, the high unemployment rate in the community (Anonymous: 1995: 24).

That is, responsibilities for both the community and the local authorities were created by this campaign, but in practice it was a so-called 'chicken and egg' situation, as each party was waiting for the other to perform. The government's core team for promoting and planning the *Masakhane* campaign believed that this stalemate situation had to be broken, and people had to be encouraged to pay for their services while the local authorities were at the same time working at fulfilling their obligations (*loc.cit.*). I am

aware of isolated successes which have been reported at various centres around the country, but the overall success of this campaign is not known.

I am arguing, from the local authority's point of view, that things have to be done differently to show commitment to the *Masakhane* policies, and to demonstrate the will to improve all aspects of servicing. The White Paper on Local Government points out that one of the main criteria for the provision of services is accessibility, and accessibility is closely linked to affordability (South African Government: 1998a.: 113). The points are made that local government should be innovative in constructing policies and setting tariffs to ensure that the services are installed at the appropriate and sustainable level, and that the tariffs are set in such a way that they are affordable. This could be achieved possibly by cross-subsidisation within and between services, and between high and low-income consumers (*loc.cit.*). As mentioned above, the system of charging and collecting payments also has to be re-worked, to ensure accessibility in this area as well.

The local government structures, in this case the PMTLC, cannot continue indefinitely to provide services without collecting payment, and also cannot expect the people to pay if the payment procedure is almost impossible to access. Furthermore, the PMTLC should examine carefully its water supply systems for sustainability. Studying Map #7, most households in the GEA obtain their water supply from communal taps, for which no payment is made and which are the cause of considerable wastage of water. In addition, the supply of water to 1300 families in outlying communities by water tanker on a daily basis costs the PMTLC around R3 million per year, which is not recovered from the consumers at present. Tariffs have been set and attempts will be made shortly to recover service charges from users (Greatwood, personal communication: June 1999). The sewerage disposal service should be similarly examined for sustainability.

To facilitate the determination of affordability and appropriate levels of service, the PMTLC has also collected information, as part of the *Masakhane* information programme, on the socio-economic breakdown of the GEA, household by household. Figures available are those such as the number of people in each household who are employed, the number who are employable, and the total earnings per household (where people were prepared to give this information).

The implications for the design of the land records system are that the system should record data on the status of the services in the GEA, as well as an indication of the socio-economic breakdown of the residents in the area, township by township, or household by household as the PMTLC has done. In addition, the land records system should be designed to indicate all the municipal services, not only the so-called line services such as water or sewerage, but also the so-called 'soft' services such as waste removal and street cleaning. The land records system should also assist in monitoring to ensure that a reasonable service is being offered, at the same frequency and standard as in the other more affluent parts of the city.

The land records system should be designed to facilitate and monitor the delivery and the payment of accounts. For example, the payment points should be shown on the land records system, and by creating buffers of, say, two kilometres radius around each payment point, it can be seen at a glance whether there are large numbers of consumers who are out of easy reach of payment points. Another example is for the land records system to be used to establish street addresses for each household, and to plan the location of cluster-box sites in consultation with the postal authorities. The postal authorities can then deliver post to the houses, or they can erect the cluster of post boxes for an area, to ensure that all residents have access to a postal service for the receipt of the bills associated with the payment of rates and service charges and bond installments.

2.6 Conclusions

I have shown that, in terms of the government's reform and upgrading policies, local government has the responsibility for the upgrading of informal settlements within its area of jurisdiction. The PMTLC should therefore develop and manage an appropriate land records system to manage the information required and the processes involved in upgrading. The PMTLC should also use the land records system to facilitate the implementation of its other responsibilities in terms of the Constitution, namely the creation of a safe and healthy environment and the provision of at least a basic level of services to all its residents in a sustainable manner. In order to deal with the sustainability aspect, the PMTLC should also make use of the land records system to facilitate the fulfillment of the aims of the government's

Masakhane campaign policies, by making it easier for consumers to receive bills for rates and service charges and to make these payments.

The design of the appropriate land records system will depend upon the characteristics of the information required and the processes which have to be managed. Firstly, the point was made that the information stored in the system should be available to anyone who has a right to it. The land records system therefore should be accessible to the general public, especially the communities at the local level, and if there are any costs attached to the sale of information they should be nominal, so that acquisition of the information by the residents of the local authority area is not regarded as unaffordable.

The implications of the government's policies on the design of the land records system are that it should show all the parcel-based land rights identified above, namely the freehold cadastral boundaries and land rights, including any rights of initial ownership in terms of the DFA, any inferior (DDA) land rights, and any parcel-based upgradable rights if this is chosen as one of the land tenure reform models to be offered as an option. In addition, certain details of these land rights need to be recorded. In the case of the formal freehold cadastral rights, references to the official records and the registered owners need to be recorded, as well as any occupants of the property who claim to be the owner but do not match the name recorded in the official registration records (these people are therefore informal owners). In respect of the inferior (DDA) land rights, the rights holders and type of right, as well as its Schedule 1 or Schedule 2 rating in terms of the ULTRA Act, should be recorded. As mentioned earlier in this chapter, many of these rights will be overlapping, either inferior over freehold, or even several overlapping inferior rights over freehold cadastral rights - all should be captured and shown.

In addition the system should be designed to show the non-parcel-based land rights which are, or may become, part of the official land tenure reform models. Examples of these non-parcel-based land rights are the *de facto* land tenure in existence in conventional informal settlements in the GEA, which are in the form of the adapted form of the Zulu customary land tenure system (see Chapter Five), any "current owners" on private land in terms of the White Paper on South African Land Policy such as tenants (South African Government: 1997b: 64), and any informal land holdings. In addition, regarding potential land tenure reform models, the land records system should be designed to show the non-parcel-based titles such as firstly, starter titles in a system of upgradable land rights as proposed by Fourie (1998);

secondly, those evidenced by the so-called 'mid-point' co-ordinates in a mid-point method (Jackson: 1996); and thirdly, group titles such as the internal arrangements inside the outside figure of a development in terms of the Communal Property Associations Act (1996). Furthermore, the historical information required to build up a trail of evidence in order to justify the upgrading of rights such as the existence of evidence of the duration of *de facto* tenure and informal land holdings (possibly by aerial photographs), any records of occupation by service providers such as ESKOM, and any recorded tenants' agreements with land owners should also be recorded. The land records system should therefore be designed to accommodate temporal (historical) information.

The implications of the provision of services on the design of the land records system are, firstly, that the system should record data on the status of the services in the GEA, as well as an indication of the socio-economic breakdown of the residents in the area, township by township, or household by household as the PMTLC has done; and secondly, the positions and necessary details of the existing municipal services should be recorded. There are two implications on the appropriate technology to be employed in the design of the system. Firstly, in order to deal with the large amount of data on services applicable to each household, such as the PMTLC's *Masakhane* data, the land records system should be designed with full relational capabilities, so that spatial relationship queries can be processed involving information in separate, but linked, data bases. Secondly, at the other end of the technology scale, if the information on services is such that it is not appropriate that the services are recorded in the land records system itself, then they should at least be retained in a separate, but linked, land information system managed by the local authority, where the two sets of information can be combined, for the purposes of viewing or outputting. In some cases it may be expedient to retain a paper-based information system, of plans for example, and to link it to the land records system by cross-references only. These aspects will be discussed in further detail below (see Chapter Six).

Regarding the cost recovery process, the land records system should be used to plan the positions of cluster post boxes to be installed at various points in the GEA by the postal authorities to ensure that everyone has access to a mail delivery service for, amongst other correspondence, bills for the payment of rates and service charges. The land records system could also be used by the local government structure to plan the location of payment points for the payment of these municipal charges, to ensure that payment points are situated at convenient locations and within a reasonable distance of the bulk of

the urban population who receive services. For these purposes the land records system should have a fully relational spatial database which would facilitate spatial relationship queries such as determining the number of service consumers which fall within a buffer distance of, say, two kilometres around a proposed central payment point or cluster post box site.

Finally, the system should be designed so that it is flexible enough to be easily updated when circumstances change. This applies to upgrading of land tenure rights, changing of land tenure models following land tenure reform, updating mapping when the situation on the ground changes, upgrading and provision of services, and the addition or relocation of post box sites or payment points.

CHAPTER THREE

A CONCEPTUAL FRAMEWORK FOR INFORMAL SETTLEMENTS IN THE GREATER EDENDALE AREA

3.1 Introduction

Informal settlements are common in South Africa. As I will show below (in Chapters Four and Five) the policies of the previous governments caused informal settlements of various forms to develop throughout the country, but mainly in urban and peri-urban areas. The most common form is the conventional informal settlement. However, I will show below that in the GEA all settlements exist on a continuum of formality-informality, and that informal aspects exist in almost every form of land tenure pattern in the Greater Edendale Area, including those which appear to be formal.

I shall now examine some broad definitions of informal settlements from both local and international literature involving the study of informal settlements, and will show that the informal settlements in the Greater Edendale Area conform to these broad definitions. I shall develop the concept of the continuum of formality-informality further in relation to the GEA and show that other forms of settlement in the GEA, previously considered to be formal, should be considered informal. It is important to note that the focus of this dissertation is on informal settlements - and isolated cases of informality in the GEA will not be covered.

3.2 Review of Local and International Literature

Firstly I will examine definitions from Hindson and McCarthy (1994) and Durand-Lasserve (1996). Thereafter I will discuss the definition developed by Davies (1998) specifically for informal settlements in East London (Eastern Cape), and investigate further the continuum of formality which is the basis of Davies' definition, adopted from Doebele (1994).

3.2.1 Broad Definitions of Informal Settlements

Generally, conventional "informal settlements are defined as dense settlements comprising communities housed in self constructed shelters under conditions of informal or traditional land tenure" (Hindson and McCarthy:1994: 1). Durand-Lasserve (1996: 1-2) defines an informal settlement as "an area or settlement where development (spatial expansion) and occupancy are not conforming to the legal, urban and environmental standards set by public authorities". The first definition deals with the important points that these settlements are dense, the structures are self-constructed, and the resultant tenure systems are informal or traditional. As such the first definition refers mainly to the conventional form of informal settlement described above, where the settlement is contiguous and comprises densely settled informal housing. The second definition is somewhat broader, and makes the important point that informal settlements do not conform to the various standards set by the authorities.

To add to the above definitions, in general, informal settlements are overcrowded and inhabited by poor people, and there is generally no security of tenure for the people living there. In addition, there are usually little or no municipal services provided to such settlements, and the living conditions are unhealthy, and even dangerous, (Durand-Lasserve: 1996, Hindson and McCarthy: 1994). From my observations these points are generally true of conventional informal settlements in the Greater Edendale Area as well.

Examining Durand-Lasserve's definition above more closely, and referring further to his paper, his definition is extremely broad. For example, in addition to the definition covering the most common case of a "squatter settlement" which has no legality, no services, and contains shacks built of whatever informal building materials the occupants can lay their hands on, Durand-Lasserve (1996) lists other possible "causes of the irregularity" (informality), which he points out are "numerous and generally cumulative", and which include: the sale or rental of the property may be illegal, the transfer may not have been formally registered, the planning or land-use regulations may have been contravened, or "the building and construction norms and standards (were) not complied with" (*ibid.*: 2).

This definition of Durand-Lasserve's (1996) shows that there are various levels on which the informality of an informal settlement may be judged. I have observed this to be the case in the GEA too, where some informal settlements are very structured, have some basic services, and appear to

have developed with some planning and forethought, whereas others do not exhibit such indicators of formality. To develop the idea of different levels of informality further, I will now examine the definition developed by Davies (1998) which includes the theory of a continuum of formality.

Davies (1998: 105), drawing from Doebele (1994) and the UNCHS Urban Management Programme (1991), and concentrating on conventional informal settlements in East London (Eastern Cape) defines an "urban informal settlement . . . as any settlement that exists on a continuum of development, and is jointly managed by the local community and the local authority in proportion to the influence of the local structural tension on the local tenure system in the settlement". He acknowledges that this definition, unlike "classical definitions" which are based on legal frameworks and development within these frameworks, such as those given above, is instead based on the concept of a continuum of development, and as such accommodates certain contradictions, where some aspects of the informality of the settlement have been formalised, and others have not, or where, even without formalisation, the settlement exhibits signs usually associated with formalisation, such as order, and security of tenure (*ibid.*: 104). Davies also refers to the continuum of development as the continuum of formality (*ibid.*: 98)

These definitions of informal settlements above require further investigation and discussion so that they can be understood in the context of the informal settlements in the GEA which are to be managed using the land records system to be designed for the area. However, for clarity, a distinction should be drawn at this point, between informal settlements and squatting. All informal settlements are without authority because they contravene the town planning and building laws with regard to density, spacing, construction of buildings, land tenure, *etc.* Squatting, while being a form of informal settlement, is also illegal as it exists on land without the permission of the legal owner of the land (Fourie: 1993: 5, Surplus Peoples' Project: 1983: 195-197, Durand-Lasserve: 1996: 1-2). In other words, a squatter settlement is an informal settlement where it is known that the owner of the land has not given permission for the settlement to take place on the land. However, as it is often impossible to determine whether a settlement is with the approval of the landowner or not without an in-depth study and actually interviewing people on the ground, they will all be referred to as informal settlements. A case in point are all the informal settlements on State owned land in the GEA. It is unlikely that each occupant, or even each community, obtained specific authority to settle on the State owned land there, but on the other hand, most of these settlements have been in existence for many years, and the State has never taken any action to attempt to evict them, thereby giving its tacit agreement to their remaining there.

I am arguing that the definitions of informal settlements from Durand-Lasserve (1996) and Davies (1998) cover all aspects of informal settlements in the GEA. Furthermore, I will show that additional formal forms of land tenure in the GEA also contain aspects of informality (discussed below in Chapters Four and Five). I will show this in relation to each land tenure pattern investigated in the GEA.

3.2.2 Continuum of Formality-Informality

Davies (1998: 97-106), points out that a conventional informal settlement is not totally "legal" nor entirely "not legal" (*ibid.*: 98). Instead the formal, and local informal systems, work together in a manner dependent on the specific local conditions and situation to create a settlement with its own characteristics. The degree of development, or of formality or informality of each settlement, falls somewhere on the continuum between the two extremes. Davies also argues that the same holds true for the levels of physical development, socio-economic profile, and legality of the settlement. He suggests that squatting on unsurveyed and undemarcated land, with no statutory recognition and no services, would be at the totally informal end of the continuum, while, for example, shacks constructed of informal materials, not in accordance with statutory building requirements, but on formally surveyed and serviced so-called 'site and service' schemes, would be towards the formal end of the continuum (*loc.cit.*).

Whereas Davies (1998) focussed on the continuum theory in relation to conventional informal settlements in the East London area, I will show that all forms of tenure in the GEA exhibit certain aspects of informality, and therefore also exist at some point on what I shall call, the continuum of formality-informality. That is, formal areas usually not classified as informal settlements also have informal characteristics because of the history of South Africa. For example, many of the freehold properties in Edendale Proper and Plessislaer which appear to be privately owned and thereby constitute formal settlement, have not been registered or the registration is not current (see Chapter Four). Secondly, there are inferior titles registered under legislation relating to the former Department of Development Aid which overlap State freehold and sometimes also other inferior titles (see Chapter Four). Thirdly, tenants on State or privately owned land in so-called 'backyard shacks' almost invariably have no recorded rights of tenure (see Chapter Five). Finally, the unrecorded *de facto* tenure of the conventional informal settlements on State owned land (see Chapter Five). All these examples show levels of informality of the land tenure under which the properties are held, and do not comply with the government's land tenure reform policy of all properties being registered in some form of ownership on a single, non-racial system, as discussed above (see Chapter Two). On

the other hand, in many cases the latter two examples of informal settlement will at least have some aspects of formality in respect of some form of municipal services provided to the settlements.

I argue that the provision of services to a settlement also exists on a continuum of formality-informality. As I have shown above (see Chapter Two), there are various levels or standards of service which apply to a settlement. The level of service provision is usually related to the level of formality of the settlement, and this is related to the socio-economic status of the residents of the settlement, and their ability to pay for the services provided (Pietermaritzburg-Msunduzi Transitional Local Council: 1998). This implies therefore, that the level of formality of the land tenure dictates the level of formality of the services, and each exists on its own, but related, continuum of formality-informality.

This has implications for the design of the land records system as it will have to be flexible to allow for the updating of the service-related data when the services in the area are installed or upgraded to a higher standard. The land records system should therefore reflect the level on the (services) continuum of formality-informality at which the municipal services for each settlement exist.

I will discuss the aspects of informality in respect of land tenure in all types of informal settlements in the GEA in more detail below (see Chapters Four and Five), and the implications of this informality for an appropriate land records system for the GEA. I will show that there are informal aspects, at various levels on the continuum of formality-informality, in all forms of land tenure patterns in the GEA, including the freehold properties which were previously considered to be entirely formal title. Furthermore, I will show (see Chapter Five) that also on this continuum are informal settlements with unrecorded tenure in the form of tenants on the privately owned land, as well as conventional informal settlements on the State owned land. This will have further implications for the design of the land records system as it must cover the whole of the GEA, and encompass all types of tenure, formal and informal.

3.3 Conclusions

I have shown that the forms of settlement in the GEA conform to other types of settlement described in both local and international literature. In particular the continuum of formality referred to by Davies (1998: 98) also applies to both conventional informal settlements and other forms of informality of land tenure which exist on properties in the GEA, which were previously regarded as

formal development. In addition, I argue that the municipal services to a settlement also exist on a continuum of formality-informality, dependent on the formality of the land tenure in the settlement, as well as other factors such as the socio-economic status of the residents of the settlement.

All this has implications for the design of the land records system, as it should be flexible and be able to adjust over time to reflect the corresponding changing situation of informal settlements on the ground. The land records system should also be able to be updated to reflect any changes in the level of informality from time to time, and to show the new levels, as it were, on the continuum of formality-informality. This applies to the land tenure as well as the services to the settlement.

The level on the continuum of formality-informality in a particular informal settlement would indicate the status of the upgrading process in that settlement, with the four key indicators of such upgrading being the processes of land delivery, land tenure reform, the provision of services, and cost recovery. It should also be important to retain historical data in the system for the purpose of recording the development and upgrading process of the settlement, and to record the levels of informality at various stages during the process.

CHAPTER FOUR

THE HISTORY OF RECORDED LAND TENURE RIGHTS IN THE GREATER EDENDALE AREA

4.1 Introduction

Local government has been given the responsibility of the upgrading of informal settlements, including their land tenure and land administration systems. I am arguing that to manage the processes involved in the upgrading of informal settlements of all types, an appropriate form of land records system should be established at the local government level.

To facilitate the design of such an appropriate land records system in relation to the land tenure and land administration requirements, I shall describe the history of the recorded land tenure rights and land administration systems (as opposed to those of the unrecorded tenure, which will be dealt with below in Chapter Five) in South Africa and more particularly in the Greater Edendale Area, and evaluate the effects that this history has had on the land tenure patterns in the GEA. I will show, for example, how the previous government's *apartheid* policies, played a big part in the development of informal settlements of various types and at various levels on the continuum of formality-informality, with distinct variations, dependent on the different types of underlying tenure. I will also show that as a result of past government policies, and the history of land tenure patterns and land administration systems in the GEA, certain aspects of all forms of land tenure in the GEA, even the (apparently formal) recorded freehold rights, contain informalities of one kind or another, and fall somewhere on the continuum of formality-informality described (see Chapter Three above), and therefore should be upgraded. Examples of this informality, which are described more fully below, are: firstly, the privately owned freehold properties in Edendale Proper which have not been registered or where the registration is not current; and secondly, the inferior titles registered against surveyed portions of State owned land under legislation relating to the former Department of Development Aid.

Furthermore, I will show that the history of the recorded land tenure patterns and land administration systems in the GEA means that the national government's current policies as outlined above (see Chapter Two) have particular applications in the GEA. It is these applications which also need to be incorporated into the design of the land records system.

I will conclude by extracting, from the discussions in this chapter, those aspects which will have an impact on the design of the land records system to be created to manage informal settlements in the GEA.

4.2 The History of Recorded Land Tenure Rights and Land Administration Systems in the Greater Edendale Area

Although Edendale was developing at the same time as Pietermaritzburg just 15 kilometres up the Umsinduze River valley, there was little in common between the two. I have shown (see Chapter One above) that this separate development was largely as a result of the attitudes of the *Voortrekkers*, and later British colonists. I will continue to show that this concept of separate development became part of the government's policies early in the 20th century, and legislation regarding this ideal was enacted, restricting ownership and occupation of land by Blacks in law, and enforcing separate residential areas for Blacks and Whites.

I will show that land was acquired by the State at the national level in terms of the Land Acts of 1913 and 1936, townships were developed by the State on the land, and land in the townships was made available for occupation by Blacks under a variety of inferior forms of title. In the GEA, apart from the relatively small part of the GEA where Blacks owned land under freehold (see below), the rest of the GEA was acquired by the State and became subject to these policies and actions. In general, additional areas were declared so-called 'self-governing territories' where Blacks were also expected to live, although none of these areas fell inside the GEA. These aspects, the effects thereof on the land tenure patterns and land administration systems in the GEA, and the impact on the design of the land records system for the PMTLC, are discussed below. I will deal with the history of the recorded land tenure patterns and land administration systems in the GEA in two sections, firstly under private freehold ownership, and secondly under State owned land.

4.2.1 Private Freehold Ownership

The history of Black private freehold ownership of land in the GEA began in the mid-19th century when James Allison, a missionary, together with 100 Christian Black families of various origins, settled on the farm Welverdiend (now the farm Edendale No. 775). Together they purchased the farm on a share basis in 1851 and laid out a village on it in the present position of Georgetown, as well as commonage land around it on the rest (Meintjies: 1988: 66) (see Map #2).

Initially Allison was the legal owner, the other families being shareholders, until 1858 when they had paid off the farm and were then in a position to acquire freehold title (*loc.cit.*). To corroborate this I undertook a Deeds Office search which revealed that the Remainder of the farm Edendale No. 775, as it is now known, is still registered in the name of James Allison, in Title Deed No 300/1855, dating back to the year 1855. I discussed this with Mr Greene who had studied the cadastral and registration records of the GEA, and he advised that according to his investigations the Remainder of the farm now comprises only the roads and the old market square.

The farm Wilgefontein No 869, also part of the GEA (see Map #2), was also acquired by church people in the latter part of the 19th century and was similarly subdivided into private subdivisions and commonage. It appears that these subdivisions were never transferred to Blacks in freehold ownership however, but that the whole property was acquired in the late 1800s by a government immigration agency for Europeans. Blacks did, however, acquire some land in the Plessislaer area under private freehold title (KZNPA: 1992: 1, and Peckham, personal communication: June 1999).

That is, by the beginning of the 20th century, several Blacks in the GEA had acquired private freehold title in land on the farm Edendale, together with communal grazing rights in the commonage set aside on the farm for that purpose, and some land in Plessislaer. These freehold land rights were recorded in the freehold cadastral system and in the formal registration system, just as freehold rights for Whites were in the old City of Pietermaritzburg.

It will be seen below, however, that the government did not favour the private freehold ownership of land by Blacks outside of the designated reserves, and its land policies of the early 1900s sought to control this.

4.2.2 The Land Acts of 1913 and 1936, and the South African Development Trust

I will show the measures used by the government of the day to restrict ownership of land by Blacks to undeveloped land within designated reserves. To achieve this the Union Government attempted to prevent the acquisition of any further so-called 'White' land by Blacks, by passing the Natives Land Act of 1913. This Act also apparently protected Black freehold land from further encroachment by Whites (Surplus Peoples' Project: 1983: 34, quoting Christopher: 1969: 336-337). A schedule to the Act identified various areas across the whole country, and Blacks were prohibited from acquiring land outside of these reserves. These scheduled areas comprised only 7% of the total land area of South Africa. Noticeably, the schedule to the Act left out extensive areas of existing Black freehold land as well as unsurveyed State land which had long been regarded as land for Blacks (van Gysen: ND: 3). From my examination of the schedules and the Surveyor General's compilations, I have determined that no scheduled areas were identified within the GEA, but fell on land immediately adjacent to the area, e.g. Vulindlela and the Zwartkop Native Location No 4669 (See Map #1).

Shortly after the 1913 Land Act the government acknowledged that the reserves should be increased, and further areas were identified, mainly bordering on previously scheduled land. It was only some twenty years later, in 1936, however, that the Native Trust and Land Act was actually passed, effectively releasing this additional land for occupation by Blacks, and increasing the reserves for Black occupation. Nevertheless, these reserves still amounted to a total of only 13% of the total land area of South Africa (Fourie: 1996: 262-263, van Gysen: ND: 3, Surplus Peoples' Project.: 1983: 34). These released areas were proclaimed by a series of Proclamations. Once again, however, a number of Black owned farms as well as extensive State owned land settled under tribal tenure by Blacks across the country were still excluded from the released areas (van Gysen: ND: 4). From my examination of the schedules I have determined that large portions of the GEA were proclaimed as released land in terms of the 1936 Land Act.

The South African Native Trust (later the South African Development Trust, or SADT) was also created in terms of the 1936 Act. In addition to having the ownership of the Black reserves vested in it, it was also charged with the task of buying up the quota of additional land referred to above, to be added to the reserves to make up the full 13% (van Gysen: ND: 4). This land became known as Trust land. The whole of the GEA, apart from that land in Edendale Proper and Plessislaer which was privately owned by Blacks, was eventually purchased by the SADT and proclaimed as released areas (KZNPA: 1992: 1), with the final remaining part of Plessislaer being acquired by the SADT and proclaimed as late as 1986 (personal research of the Surveyor General's records: 1995).

All the released areas in the GEA, apart from those properties which were privately owned and retained by Blacks, and those isolated few still retained by Whites, Indians and Coloureds were eventually acquired by the SADT and became Trust Land (KZNPA: 1992: 1). My investigations of the Surveyor General's records have revealed that, unlike many (usually rural) parts of the country where large tracts of State owned land have never been surveyed and defined, all the State owned land in the GEA has been surveyed and defined by diagram in the Surveyor General's records. This has a positive implication for the design of the land records system, as all land in the PMTLC area is therefore recorded in the same formal freehold cadastral and registration systems, although as I will show, not all rights in land in the GEA are registered in the same system.

Townships for Blacks were laid out and some of these constructed on parts of this land. The towns of Ashdown and Plessislaer are the oldest towns on the GEA Trust lands (KZNPA: 1992: 2-3). The government, through its Department of Development Aid (DDA), and in consultation with the Pietermaritzburg City Council, laid out and built the town of Imbali in stages, beginning in the early 1960s and continuing well into the 1970s (Greene, personal communication: May 1996). Similarly, towns in Edendale East such as Units N, Q, S, T, and BB were approved and laid out by the DDA, and developers were contracted, by way of land availability agreements, to construct and install the services within these layouts on behalf of the Department of Development Aid, and to sell off the serviced subdivisions. However, most of these subdivisions were not developed by the appointed contractors, as the communities found disfavour with them, and prevented the developers from continuing with the developments (Greene and Peckham, personal communications: 1996).

As I will show below, because of the policies of the government, Blacks were prevented from owning land in the developed townships set out on State owned land. Instead, the land in the GEA, and generally in released areas throughout the country, was retained by the State, and the people were given rights in the land by way of one of the inferior forms of title devised by the government.

4.2.3 Inferior Forms of Title for Blacks on State Owned Land

In the GEA and the rest of South Africa, the Trust lands were administered and controlled in terms of several separate proclamations: R188/1969 in respect of rural land, such as those parts of Edendale East and Slangspruit which did not fall within proclaimed townships; and R293/1962 and later R29, R30, R402 and R403 all of 1988, in respect of the proclaimed townships. These proclamations also provided for inferior or "floating" forms of tenure (floating because the rights were considered by some not to be rights in the land itself, but rather rights floating somewhere above it), (Peckham, personal communication: June 1999), the most common of which were the Deed of Grant and the Permission to Occupy certificate (PTO), and to a lesser extent in the PMTLC area, the 99-Year Leasehold (Hoaten: 1996: 3, KZNPA: 1992: 20, and Peckham, personal communication: May 1996).

Although DDA general plans had been framed of these new townships and approved by the DDA, they were not to be registered in the Deeds Registry, so no cognisance was taken of the underlying conflicting freehold cadastral properties. These second tier cadastral records were related to second tier registration in the form of the inferior or restricted forms of title for Blacks referred to above. The Department of Development Aid registered in its second-tier registry these inferior land rights, such as Deeds of Grant and 99-Year Leasehold rights in respect of the developed properties in the proclaimed townships (KZNPA: 1992: 2). The survey records and DDA general plans were approved by the Surveyor General in Pretoria and sepia copies were sent to the DDA regional offices for record purposes, and for registration of the inferior or "floating" rights (Peckham, personal communication: June 1999). These forms of title, although created under various proclamations and officially recorded, are seen to be inferior and not as secure as freehold title. Also, the conditions of title are more restrictive. These forms of title were therefore not favoured by the communities as permanent methods of formal tenure.

In addition to the DDA general plans overlapping the underlying formal private freehold cadastral properties, the DDA also created overlapping amending DDA general plans of the same area, due to

amendments being made for a variety of reasons. These amending DDA general plans were created without cognisance of the underlying DDA general plans they were amending. This resulted in Deeds of Grant being issued in relation to properties depicted on both the DDA general plans and amending DDA general plans, and therefore the creation of additional overlapping rights in respect of the same land. To complicate matters even further, in some cases there are several amending general plans of the same area - for example, in Edendale Unit H there are six amending DDA general plans of the same area (Peckham, personal communication: June 1999).

I shall discuss these abovementioned inferior forms of title in more detail in the next section on the tenure patterns and land administration in the GEA today. However, I shall first make brief mention of the so-called 'self-governing territory' of KwaZulu.

4.2.4 The Self-Governing Territory of the former KwaZulu

When the so-called 'self-governing territory' of the former KwaZulu was created in terms of the Self Governing Territories Act (1971), all the scheduled areas and many of the released areas were handed over to the former KwaZulu government authorities. However, none of the released areas of the GEA were handed over to the former KwaZulu Government. Subsequently, however, by separate proclamation, two relatively small groups of properties, being the land occupied by the Edendale Technical College and the Edendale Hospital (both now Provincial assets), were placed under the ownership and control of the former KwaZulu Government (KZNPA: 1992: 3).

The Deeds of Grant and other inferior titles issued in the former KwaZulu were registered in the regional offices of the DDA and were forwarded to the former KwaZulu government offices in Ulundi for filing and safekeeping (Peckham, personal communication: June 1999). By contrast, all Deeds of Grant and other inferior titles which were registered in the GEA were filed at the regional DDA offices and, after the dissolution of the DDA in April 1992, were transferred to the office of the Registrar of Deeds in Pietermaritzburg for filing (*loc.cit.*).

4.2.5 Conclusions

This section dealt with the history of the development of land tenure patterns and land administration systems in the Greater Edendale Area. I have shown how the land tenure patterns and land administration

systems in the GEA developed separately from those in the predominantly White-occupied City of Pietermaritzburg. Ownership of land in the GEA was restricted, and instead the State retained ownership of most of the land in the area, granting Blacks land rights under one of various inferior or restricted forms of title.

In the next section the effects of this history of land tenure rights and land administration systems on the land tenure patterns in the GEA today will be examined. It will be shown that the land tenure patterns and land administration systems in place in the GEA are still varied as a result of the historical developments in the land tenure patterns and land administration systems in the area, and that the two tiers of registration still exist. I will show that these aspects will be a major factor in influencing the design of the land records system being proposed to manage the upgrading processes of the land tenure and land administration systems in informal settlements in the area, as the system will have to accommodate both these registration systems.

I will also show that these past government policies, through the history described above, had a direct influence on the land delivery process and the development of the second tier cadastral and registration systems, and have led to the need now for the upgrading of the area. This will have significant implications for the design of the land records system, which will have to accommodate the two different tiers of cadastral and registration records for the upgrading of the inferior rights. The land records system should also facilitate the land delivery process and the land tenure reform process to assist in addressing the inequalities of the past.

4.3 The Effect of this History on the Land Tenure Patterns in the Greater Edendale Area Today

4.3.1 Introduction

Stemming from the history of land tenure and land administration in the GEA, the effects are evident: land tenure patterns and land administration systems in the Edendale area today are still varied, and mostly problematical. There is still a fair amount (about 3600 properties) of private freehold land, confined to certain areas, but the titles in this freehold land are not all registered and current. In fact I

shall show that in more than half of the properties there are problems with the private freehold titles, and an element of informality has crept into the private freehold properties. A much larger portion of the GEA is State owned land. On the State land many of the occupants, mainly in government-developed townships, still hold land rights in the form of one or other inferior titles devised by the previous government. This is another element of informality which exists in the titles on a large portion of the land in the GEA. There are also many other occupants on this State owned land who live in conventional informal settlements on the land, and have no recorded proof of legal tenure at all. This form of land tenure is substantially informal, and the tenure is *de facto*, although as I mentioned above (see Chapter One), they may be protected by recent pieces of legislation which entrenches their tenure rights. The effects of unrecorded tenure will be discussed below (see Chapter Five).

Above (in Chapter Two), I discussed the policies and legislation which are in place to attempt to address the upgrading of tenure, generally. As I mentioned, the upgrading of recorded inferior titles is covered by the White Paper on South African Land Policy (1997) and the ULTRA Act. I also showed that the DFA was created to speed up the land delivery process. That is, there are government policies and legislation in place to rectify the problems. I shall continue to describe the effects of the past government's policies on the land tenure patterns in the GEA today, and suggest the upgrading processes to follow. I shall extract from these discussions any implications on the design of the land records system.

I shall discuss the land tenure patterns and land administration systems in place in the GEA today under the two broad categories of recorded land tenure in evidence in the GEA, namely private freehold ownership and State owned land.

4.3.2 Private freehold land

Although there are parts of the GEA in which the land is not State owned and assumed to be in private ownership, not all of these private freehold rights have been found to be formally registered in the Deeds Registry. The older area known as Edendale proper (previously the farm Welverdiend, now known as the farm Edendale No 775) is still mostly under private freehold ownership, as well as a small amount of land in Plessislaer (KZNPA: 1995, and Shabalala, personal communication: May 1996). Referring to Map #2, all the land in the area labelled Edendale shown white (that is, excluding the commonage),

and some of the area labelled Plessislaer, is freehold land under private ownership. However, as mentioned, the registration of this private freehold land is not without its problems. About half of the properties are either not registered, or the registration is not current. Of the other half, many of the properties are used for shack-farming and other forms of informal settlement. To present a more balanced picture, however, from my examination of Deeds Registry records, I can confirm that there are also a few legal transfers taking place in Edendale Proper as well, on average about ten in a month. I will elaborate on the above statements below, and draw conclusions for the design of the land records system being proposed.

In the GEA there were (in 1995) approximately 3600 surveyed properties in Edendale Proper (see Maps #1 and #2) (on the freehold cadastral system), depicted on approved diagrams in the Surveyor General's records, and the registered owners of about one quarter (980) of them, making up about two-thirds of the area (as they are the oldest, biggest, properties), were either dead or unknown. These properties were owned in private freehold title by people who died intestate and their deaths were never reported (KZNPA: 1995: 11); or by people who possibly fled their properties during the "political cleansing" and political violence of the late 1980s (Greene, personal communication: 1995). Since 1995 this figure of non-current registration details of properties in the GEA is virtually growing monthly, as existing or new subdivisions are transferred informally to willing buyers, usually for a nominal cash consideration, and almost invariably without registration of the transfer (Greene, personal communication: July 1998). The reasons for this are varied, but usually related to economic opportunity, the costs involved in formal transfers, and the inaccessibility of the Deeds Registry system to the occupants. The exact number of new informal transfers is unknown.

Furthermore, of the approximately 3600 surveyed properties in Edendale Proper, there were (in 1995) about another one quarter (900 subdivisions) which were not yet registered. There are three basic reasons for these unregistered properties. Firstly, some of these properties have been occupied for generations, usually by extended families, but their land rights have never been registered or formalised in any way. Secondly, there are some subdivisions which have been formally surveyed and approved by the Surveyor General, as a result of a valid consent to subdivide a registered property obtained through the correct formal procedures, but the land has never been developed, and lies dormant, with the subdivisions never having been registered. Thirdly, there are subdivisions which cannot be registered as their parent

properties are one of those which cannot be dealt with for the reason that the owner is either dead or unknown (Greene, personal communication: 1996). In all three cases referred to however, the occupants and the surrounding community can usually indicate whom they consider to be the legal owner of the property. That would almost invariably be the leader of the household occupying the property, or if there are many households, then the leader of the longest established household (Greene, personal communication: May 1996).

The above cases show that there are many freehold subdivisions which are assumed to be held under private freehold title, but which are not registered, or where the registration is not current in the freehold registration system. These are aspects of informality which have crept into the freehold registration system in respect of over half of the private freehold properties in Edendale Proper, and place these properties on the continuum of formality-informality, somewhat lower than the formal end of the scale (see Chapter Three). The freehold cadastral and registration systems therefore do not guarantee secure title. Secure title is clearly attainable under these systems, provided the property owner follows all the required steps to register any changes which may occur in the land rights pertaining to the property. It appears that, in the current system, the incentive for the property owner to want to register his or her property and to keep the registration current does not outweigh the disincentive of the cost associated with doing so. There also seem to be other cases where the property owner is not aware that the property is not formally registered and of what is required to register the property. The implications of these observations on the design of the land records system will be discussed in the conclusions below.

The remaining approximately half (1700) of the surveyed properties in Edendale Proper were (in 1995) owned by a handful of families who were members of the Edendale Land Owners Association (ELOA). These families have owned the land for generations, registering transfers from generation to generation for over a century (Natal Witness: 1998a: 7). Many of these privately owned properties, especially the larger ones, have been covered by informal settlements, and are now subject to landlord-tenant relationships. These are some of the "current owners" on privately owned property in terms of the White Paper on South African Land Policy (South African Government: 1997b: 64) referred to above (in Chapter Two), and as discussed, the government's policies in the White Paper on South African Land Policy (1997) require that their land rights be recognised and formalised. These are essentially unrecorded tenure on privately owned land and will be discussed below (see Chapter Five).

As was shown above (in Chapter Two) the local government structure has the responsibility, in terms of government policies, for the upgrading of, amongst other things, the land tenure rights within its area. The impact of these issues on the design of the land records system is that it could and should be used to manage the currency of registration of freehold property rights. In this way the land records system should identify and show cases of informal title, as described above, where the registered owner named in the official formal registration records does not reflect the name of the person who is considered by the community to be the owner. In such a manner, therefore, the land records system would facilitate the upgrading of the land tenure records.

The implications of this for the design of the land records system are that it should show the freehold cadastral boundaries and record whether each property is registered or not, and if so, give the name and other details of the registered owner of the property. Otherwise, if the property is not registered, the land records system should record and show the extent of any informal (unrecorded) *de facto* land tenure or informal land holdings, and give the names and other personal details of these land rights-holders and occupants on the property. Finally, in order to maintain the currency of the information in the system, there should be a link to the Registrar of Deeds to identify and record, in the records system, any changes in the formal registration records.

However, as I will show below, most of the land in the GEA is State owned, as opposed to privately owned under freehold, and here the Black occupants do not have secure land rights in respect of the land they occupy. Instead they hold their land in terms of one of various inferior land rights referred to above. These inferior land rights will be discussed in more detail immediately below.

4.3.3 State owned land

The vast majority of land in Greater Edendale is State owned. Referring to Map #2, almost all the land in the GEA, except the portion of the area labelled Edendale shown white and some of the area labelled Plessislaer, is State owned. All of this State owned land, apart from the commonages shown on Map #2, is Trust land. Most of the occupants on this land have one of a variety of inferior forms of tenure on the land, created in terms of various proclamations, or else have no recorded tenure rights at all. In this chapter I am dealing with the recorded land rights only, and I will briefly examine these different inferior forms of tenure for Blacks found in the GEA, namely Deed of Grant, Permission to Occupy, and 99-Year

Leasehold. In discussing these different forms of tenure on State owned land I will show how each has an implication for the design of the land records system.

There are also conventional informal settlements which have developed on the surveyed townships represented on DDA general plans which have never been developed. The informal development in these settlements does not coincide with the cadastral boundaries which have been laid out on the ground. These informal settlements therefore fall under the ambit of unrecorded tenure, and as such will be discussed below (see Chapter Five).

4.3.3.1 Deeds of Grant

Proclamation R293/1962 (and later R29/1988 after the partial repeal of the former), provided for a Deed of Grant to be registered in respect of a subdivision in a proclaimed township. The Deed of Grant document referred to a subdivision depicted on a diagram or general plan approved by the DDA, and was registered in that department's registry, thereby giving a fairly high level of security. This is by far the strongest and most popular of the inferior forms of tenure in the formal proclaimed townships in the GEA, such as Imbali, Ashdown, the various proclaimed units of Edendale East, *etc.* (Peckham, personal communication: May 1996).

In terms of the ULTRA Act referred to above (see Chapter Two), the Deed of Grant is a Schedule 1 right which is automatically upgradable to private freehold ownership by the Registrar of Deeds once the township register has been opened (Pienaar: 1996: 28-29). In respect of the GEA, in order to undertake such an upgrading, a consolidation of all the underlying cadastral records for the State owned land in the Edendale East section has been prepared, and should be registered towards the end of 1998. After this, the township general plans can be registered and the township registers opened, and the Schedule 1 tenure rights in existence on the land covered by the consolidation will be upgraded to full ownership by the Registrar. However, it has been found that in the GEA there is not even one general plan which can be dealt with as simply as this because of the overlapping inferior land rights created by at least one amendment of each DDA general plan in the area (Peckham, personal communication: June 1999).

The implications for the design criteria of the land records system are that the system should be designed so that it records the registered owner of the land as the State, but that it also records all the second tier

registration of Deed of Grant rights, including, very importantly, any other overlapping registered Deed of Grant (or other inferior) rights on earlier or later amending DDA general plans of the same township. These implications will be discussed further in the conclusions below.

4.3.3.2 Permission to Occupy

Permissions to Occupy are the least formal and least secure of the inferior forms of land rights in the GEA, and they have a different impact on the design of the land records system. Proclamation R188/1969 contained regulations relating to all unproclaimed Black areas. That is, land not proclaimed as townships for Blacks in terms of Section 30(1) of the Black Administration Act (No. 38 of 1927). It provided for the issue of Permission to Occupy certificates (PTOs) in respect of this land. Usually a PTO was issued in respect of an unsurveyed piece of land, on a standard form, specifying only an extent, and sometimes with a sketch plan attached, although any such plan seldom indicated with any certainty where the right was on the ground. However, some PTOs were issued in respect of surveyed sites in unproclaimed townships, and even some were inadvertently issued in respect of sites in proclaimed townships. In these instances copies of the approved diagram or an extract of the approved general plan were usually attached to the PTO (KZNPA: 1992: 2, and Greene, personal communication: 1995, and Peckham, personal communication: May 1996).

There are many instances of PTOs for residential purposes, as well as some for shops, on the State owned land in the GEA. Some of the PTOs are in or around the DDA townships, in conventional informal settlements, such as the settlement south of Unit J of Edendale East, between Units S and T (see Map #5) (Peckham, personal communication: May 1996). Others are on the agricultural land in the south, for example in respect of the old farm houses which were constructed for the immigrants on subdivisions of the farm Wilgefontein No. 869, but which were subsequently taken over by the State (Peckham, personal communication: June 1999). From my examination of a few such certificates I can state that the main features of the PTO are that it is a personal right issued to the proposed occupant by the DDA; it is a temporary permit to occupy a house/building, or land, or both, with very specific conditions attached thereto; there is an annual rental payable; and the rights may be terminated for any reason by the DDA with three months notice, without having to give reasons therefor, nor pay any compensation for any improvements on the land. Generally no central record was kept of these rights (Peckham, confirmed in personal communication: May 1996).

PTOs are classified as Schedule 2 rights in terms of the ULTRA Act, and as such are not automatically upgraded, but may be upgraded to full ownership at the instance of the registered owner of the land (Pienaar: 1996: 29), through the process described in the ULTRA Amendment Act (1996) (South African Government: 1996c: 4-6). As PTOs are *de jure* recorded land rights, their existence in an (apparently) conventional informal settlement, such as the one between Units S and T of Edendale East described above, are not normally expected, and care should be taken when upgrading such informal settlements to identify all such *de jure* rights and to deal with them.

The implications for the design criteria of the land records system are similar to those for the Deeds of Grant, in that the system should be designed so that it records the registered owner of the underlying land as the State. However, when recording the second tier rights, as PTOs are mostly not related to surveyed properties, the extents of the PTOs would have to be determined from aerial mapping of some appropriate type, and shown in the land records as mapping detail. The implications on the design of the land records system, to ensure that it will efficiently deal with the PTO inferior land rights and their upgrading process, are discussed further in the conclusions below.

4.3.3.3 99-Year Leasehold

Another form of inferior title created for Blacks in terms of Proclamations R293/1962 and R29/1988 mentioned above, was the 99 Year Leasehold. This was issued in respect of surveyed land shown on an approved DDA general plan. This method does not appear to have been used very much in the GEA, except that certain developers had large tracts of land registered in their name under a 99-Year Leasehold right (Peckham, personal communication: June 1999). These leasehold rights, registered as they were by the DDA, are also regarded as Schedule 1 rights in terms of the ULTRA Act (1991), and as such will be upgraded upon the opening of the township register, as was the case described for Deeds of Grant. However, these developers have developed some of the land, and transferred portions of this developed land by way of Deed of Grant to individuals. These actions have created further overlapping (inferior) rights. In these cases the developer's 99-Year Leasehold right is overlapped by Deeds of Grant in favour of the individual purchasers (Peckham, personal communication: June 1999).

The implications for the design criteria of the land records system are similar to those for the Deeds of Grant. The system should be designed so that it records the registered owner of the land as the State, as well as all the second tier registration of 99-Year Leasehold rights, and, very importantly, any other overlapping Deed of Grant (or other inferior) rights on earlier or later amending DDA general plans of the same township. Once again, the implications of recording this inferior land right in the land records system will be discussed further in the conclusions below.

4.3.3.4 Conclusions

I have shown that, due to the history of the recorded land tenure rights and land administration systems in the GEA, there is a wide variety of recorded land tenure and land administration systems in place in the area, especially on the State owned land. As the whole of the GEA is covered by formally surveyed and registered freehold properties, either in State or private ownership, any additional land rights which exist in the GEA are overlapping land rights. These overlapping land rights may be in the form of recorded land tenure rights as discussed above, or may be unrecorded land tenure rights which exist on the State owned land, which will be discussed below (see Chapter Five). I have shown above that in some places there are many overlapping rights in respect of the same piece of land. I have argued that these are aspects of informality which exist in the land tenure rights on the State owned land in the GEA, and that most of the area covered by the State owned land in the GEA exists at some level on a continuum of formality-informality, at varying levels below the totally formal level, as far as land tenure rights are concerned. As certain aspects of most of the land rights on the State owned land in the GEA are informal and need upgrading, the whole area which is State owned needs to be covered by the land records system, for the management of the upgrading of these informal land rights.

The implications for the land records system are that the system should be designed, firstly, so that it records and shows all the parcel-based cadastral and registration data. That is, it should show the formal freehold cadastral boundaries and registration details, in this case of the State owned land in the GEA, the registered owner being the State, and it should also record the second tier registration rights, such as Deeds of Grant, Leasehold, and PTOs, and the registration details of these inferior land rights holders. Extra care should be taken to identify any registered overlapping inferior rights due to amending DDA general plans having been approved and the underlying portion of the DDA general plan never having been cancelled. Of these recorded land rights, PTOs are the most difficult to identify, as they are not

centrally recorded, but care should be taken to identify them, possibly scattered throughout a conventional informal settlement on State owned land, and to record them in the land records system.

The design of the system should also ensure that the records of the inferior land rights recorded in it are upgradable, to mirror the legal position when they are eventually upgraded to private freehold ownership in terms of the ULTRA Act. Built into the system should be a link to the Registrar of Deeds for the purpose of determining when these rights are upgraded. The land rights in the land records system should then be easily updated to reflect any changes in the legally registered rights, in this case the upgrading of the inferior rights to full ownership, or some other form of ownership established in terms of the government's land tenure reform policies.

The implications are also that, in order to cater for the majority of PTOs, which as discussed above are in respect of unsurveyed pieces of land and therefore are not parcel-based, the land records system should be designed so that it can also record land rights which do not refer to a surveyed property or parcel. The extent of these rights is usually demarcated somehow on the ground by the holder of the right (although often exaggerated), but as mentioned above, can be scattered throughout an (apparently) conventional informal settlement on State owned land, and after adjudication if necessary, the mapping of these existing land rights on the ground should be done using appropriate technology to provide the required information at an acceptable level of accuracy and at the lowest possible cost (refer to Davies: 1998: 20-26 for a discussion of this process).

4.4 Conclusions

I have shown that, as a result of previous government policies, there is a "skewed distribution of land ownership" in the country generally (Fourie and van Gysen: 1996: 353), as well as in the Pietermaritzburg-Edendale area. The land tenure patterns and land administration systems in existence in the GEA today are varied and reflect the historical development of these patterns and systems under the influence of the policies and laws of the former colonial and *apartheid* governments of the country.

I have identified the various types of land tenure patterns and land administration systems which are found in the GEA. There is a limited amount of privately owned freehold land in certain parts of the area. The majority of the land is State owned, and on this land Blacks were issued one of a variety of inferior forms of title. In addition there are informal settlements with unrecorded land tenure, both on the State land and on the privately owned land. This unrecorded tenure will be discussed below (see Chapter Five). I have argued above that there are elements of informality in at least half of the privately owned freehold properties and on most of the State owned land in the GEA, and that all land tenure in the GEA exists at various levels on a continuum of formality-informality, depending on its degree of informality.

Regarding the freehold land rights, I have shown that changes of ownership, either on transfer or on death and subsequent inheritance, have not been registered, or the properties have never been registered at all, in respect of at least half of the 3600 formally surveyed properties in the GEA which are capable of being formally registered in private ownership. I am not aware of the spatial distribution of these properties, but the proportion is large enough to state that the private freehold portion of the GEA therefore contains a significant amount of informal titles within it. In terms of the definitions above, about half of the private freehold area of Edendale therefore should be regarded as informal settlement in terms of the definition involving the continuum of formality-informality. The registered titles in the whole area covered by privately owned freehold titles should therefore be held under suspicion until the individual informal titles can all be positively identified and upgraded by registration. In the meantime, all titles should not be dealt with until they have been verified as correct. I deduce therefore, that the freehold cadastral and deeds registry records do not guarantee formality and legality of tenure in the GEA.

Where the State is the registered owner, the State has granted the occupants on this land, who are mainly, but not exclusively, in townships developed by the State, various forms of inferior title in respect of pieces of the land. These inferior forms of title which vary in strength and sophistication, but which are all less than freehold ownership, can be summarised as Deed of Grant rights and 99-Year Leasehold rights, both of which relate to formally surveyed properties depicted on an approved DDA general plan, and certificates of Permission to Occupy, which normally relate to unsurveyed and undemarcated pieces of land. All these titles in the DDA townships by which land rights were granted to Blacks living there are informal as they are inferior overlapping land rights superimposed over the freehold title in the name

of the State. Bearing in mind also the many conventional informal settlements with *de facto* unrecorded tenure on vacant, undeveloped State owned land, between and within DDA townships in the GEA, and on the commonages of the farms Edendale No. 775 and Wilgefontein No. 869 (see Chapter Five below), I argue that the State owned part of the GEA with recorded land tenure rights and unrecorded tenure should also be regarded as largely informal on the continuum of formality-informality discussed above.

The government's policies regarding the upgrading of informal land rights, clearly have application in the GEA, and an upgrading programme should be initiated. I am arguing that, although there is no clear legal responsibility at this stage, indications of future government policy are that the PMTLC local government structure should develop and manage an appropriate land records system to manage the upgrading process in the GEA.

As concluded above, overlapping land rights are common in the GEA. As a result, the land records system should be designed to deal with such overlapping land rights in a dual system. Regarding the freehold land rights, the land records system should record the official freehold cadastral and registration records for the whole GEA, both privately owned and State owned, but efforts will have to be made to verify that, where the land is registered in private ownership, the registered owner is still alive and regarded as the owner of the land. Where investigations show that this is not the case, the names and personal details of the occupants and the person or persons who claim to be the owner should be determined and recorded in the land records system, as well as the length of tenancy of the current occupants, and the personal details and lengths of tenancy of any previous occupants, if possible. This will enable a trail of legal evidence to be established to facilitate adjudication of the land rights, and the determination of the rightful owner. The system therefore should be designed to also accommodate historical data.

Where the land is registered in the ownership of the State, and overlapping inferior forms of title devised by the previous government exist, the holders of these inferior land rights should also be recorded. I have shown that when considering the design of the land records system, the parcel-related Deed of Grant and Leasehold rights should be recorded in parallel with the freehold system. That is, the underlying freehold cadastral records should be recorded, as well as the cadastral records depicted on the DDA general plans and any amending DDA general plans, with the registered owner recorded as the State, but the names

and personal details of the occupants being the inferior right holders, should also be recorded. In order to deal with the Permissions to Occupy in the land records system, the extent of the physical land rights on the ground would have to be first adjudicated, and then determined from appropriate mapping, and recorded in the land records system, together with the names and personal details of the holders of the PTOs.

In the next chapter I shall discuss the situation relating to the informal settlements with unrecorded tenure in the GEA, and evaluate the impacts of these settlement patterns on the design of the land records system. In the final conclusions (in Chapter Seven) I shall present a conceptual design for the land records system for the informal settlements in the GEA, and show that all the information requirements and design criteria identified throughout this dissertation, will be contained within this conceptual design.

CHAPTER FIVE

UNRECORDED LAND TENURE IN THE GREATER EDENDALE AREA

5.1 Introduction

It is normally understood, and in terms of the definitions of informal settlements presented and discussed above (in Chapter Three) it is implied, that all informal settlements have unrecorded land tenure. However, I have already shown above (see Chapter Four) that there are aspects of informality in the (apparently) formal recorded land rights in certain parts of the GEA, rendering them less than formal. In order to distinguish between those settlements which are informal because of the informality of their recorded tenure rights as discussed above in Chapter Four, and the more conventional informal settlements and other forms of informal land tenure where there are no recorded tenure rights, I shall refer to the latter, which I shall discuss in this chapter, as informal settlements with unrecorded land tenure.

I have shown above (see Chapter Four) that one of the major underlying reasons for the formation of informal settlements was the effect of the *apartheid* policies of the previous governments which caused a skewed pattern of distribution of land in South Africa, and an artificial shortage of land for Blacks throughout the country. Another main deep-rooted reason is poverty - most inhabitants of conventional informal settlements are the urban poor and very poor and cannot afford to live anywhere else (Durand-Lasserve: 1996: 3).

A further main factor however, which, in conjunction with the above has caused conventional informal settlements to be established in and around almost every city and town in South Africa, including the GEA, is the inability of the formal land delivery system to cope with the demand for land (Fourie, personal communication: July 1998). Great expectations of rapid housing delivery were created in the

minds of many landless and homeless people by the new government during the election campaigns in the first quarter of 1994, thus vastly increasing the already present demand for land (confirmed by Shabalala, personal communication: May 1999). Although some of the land reform measures initiated by the previous government in 1991, and revised and renewed by the current government since 1994, have aimed to remove most of the restrictions related to the formal land delivery process and speed it up, these have generally had limited success. The formal land delivery system has not been able to keep pace with the demand for land, and people as a result, are resorting to acquiring land for settlement through the informal land delivery system.

That is, many Blacks are driven to find land on which to settle informally, due to: firstly, these past policies which created an artificial shortage of land; secondly, the poverty of the people; and thirdly, the slow formal land delivery system which causes people who are desperate for a place to live to bypass the system. Many Blacks have therefore created and settled in informal settlements of various forms, without recorded tenure rights, throughout the Greater Edendale Area, because of these driving forces. Other factors have been the perceived availability of land in the GEA, and its proximity to job opportunities, schools, shops, and transport routes, (adapted from Schlemmer *et.al.*: ND: 12; Jenkins *et.al.*: 1986: 10; and confirmed by Shabalala, personal communication: May 1996, and Peckham, personal communication: May 1996).

As a result, two major forms of informal settlements with unrecorded tenure have developed throughout the GEA, namely, conventional informal settlements on State owned land, with *de facto* tenure (where the residents' tenure on the land depends on their continued occupation of the land), and shacks on privately owned land (mainly under freehold title, but also possibly on land under inferior titles) with unrecorded landlord-tenant arrangements. From studying Map #9 (see Appendix A), I estimate that these two forms of informal settlement with unrecorded tenure in the GEA, make up about 60% of the housing in the GEA.

Some of these settlements have been in existence for a long time, but their *de facto* land tenure or informal land holdings are not recorded. It has been shown above (see Chapter Two) that it is government policy to recognise and formalise such established land rights, and to upgrade these

settlements. Therefore, it is mainly for the purpose of managing these processes that the land records system is being proposed.

As I have pointed out, the main focus of this dissertation is to extract the design criteria for an appropriate land records system to facilitate the management and upgrading of informal settlements in the GEA. I have shown that these informal settlements with unrecorded tenure are a result of the history of the past governments' land related policies. I shall discuss these two common forms of informal settlements with unrecorded tenure, namely the conventional informal settlements on State owned land under *de facto* land tenure, and the backyard shack developments on Black privately-owned land, in more detail below, and examine the characteristics of the land tenure patterns found in these settlements. I will show that these informal settlements and their land tenure patterns fall under the ambit of the present government's land tenure reform policies discussed above (see Chapter Two). Finally I shall extract the requirements for the design of the land records system to manage the upgrading (land tenure and services) of these informal settlements with unrecorded land tenure in the GEA.

5.2 Conventional Informal Settlements on State Owned Land in the GEA and their Land Tenure

Conventional informal settlements have developed on many suitable vacant and unused pieces of State owned land in the GEA, for example on large tracts of State owned land between developed DDA townships which are otherwise unoccupied and unused (see Map #5). Another example is where a DDA township was planned and surveyed, but the development and formal settlement has never proceeded (see Map #6). However, the State owned commonages of the farms Edendale No. 775 and Wilgefontein No. 869 (see Map #2) are largely vacant, due mainly to their steepness and their remoteness from municipal services (Shabalala, personal communication: August 2000).

A common feature which is noticed when examining the maps showing examples of these settlements is that they are not very densely settled (compare these maps with Map #4 which shows dense informal settlements on privately owned land). This is thought to be because the State owned land is more plentiful, so there is less pressure to densify the settlement (Peckham, personal communication: May

1996). Therefore, the underlying legal tenure does appear to affect the settlement pattern of informal settlements which develop on the land in the GEA. Cross (1994: 177) agrees that both the underlying legal tenure, and assumptions of property rights, have influenced the ways in which urban informal residents think about land tenure. Further evidence of this in the GEA will be discussed when the informal settlements on privately owned land in the GEA are examined below.

However, Cross (*loc.cit*) points out that an equally strong and more traditional influence on urban informal tenure is the cognitive model of the rural tenure systems which rural to urban migrants brought with them from home or absorbed in childhood from rural born adults. Durand-Lasserve (1996: 6) confirms that customary land tenure systems in Sub-Saharan Africa are the dominant land tenure system in urban areas. Therefore, customary tenure should be respected equally to any other land tenure system imposed by the authorities. From a discussion with Mr Shabalala, I can confirm that in the GEA the cognitive model of rural tenure systems referred to by Cross (1994), and the dominant land tenure system referred to by Durand-Lasserve (1996), is the Zulu customary land tenure system. I will show below how the principles of this rural model of the Zulu customary land tenure system have been brought to the urban areas, including the GEA, and adapted, in a modernised form, to the urban situation.

There are isolated cases where some occupants of (apparently) conventional informal settlements on State owned land have PTOs to occupy the land. In such a case the holder has *de jure* occupation rights. An example of this is the settlement south of Unit J of Edendale East, between Units T and S, shown on Map #5 (Peckham, personal communication: May 1996). As mentioned above, these are isolated cases and not a tenure pattern throughout the GEA. However, these legal land rights must be taken into consideration when formalising and upgrading such settlements, as they are *de jure* land rights. The land records system should therefore record the existence of all PTOs so that they can be taken into consideration when upgrading the settlement. The extents of these rights should be recorded as for all the other non-parcel-based tenure, but the existence of these *de jure* land rights in respect of the PTOs must be clearly recorded in the land records system, so that they can be dealt with at the time of upgrading. The land records system should be updated after the upgrading to record the new upgraded land tenure rights.

The main principles of the adapted form of the Zulu customary land tenure system, as they apply in the urban setting, are examined immediately below. These aspects will have implications on the design of the land records system, and the implications identified will be drawn out at the end of this discussion.

5.2.1 The Zulu Customary Land Tenure System

The first rural principle adopted in the formation or establishment of a conventional urban informal settlement is that occupation creates tenure. Suitable land found to be vacant and unoccupied may be occupied. In particular, considering the various types of State owned land discussed above, where such a piece of State owned land is found by a group of people searching for a place to settle informally, it is often entered upon and settled. According to Cross (1994), the "first family lines" of the "local political hierarchy" to settle in an area are expected to provide the control in allocating land and overseeing the process of settlement (*op.cit.*: 178,181). This is the principle by which conventional informal settlements initially develop; land which is vacant and appears uncontrolled is settled upon, and the evidence of occupation is what is important in establishing the rights to land in the settlement. As described above (see Chapter Three), the limits of settlement are almost invariably unaffected by any surveyed parcels which may exist on the land, such as a planned and surveyed, but not developed, DDA township described above (see Map #6). The control of access to the land by others is discussed further below. For the purpose of the design of the land records system, these physical limits of occupation, both of the settlement as a whole, and of the individual tenure of each occupant, should be determined and recorded in conjunction with the ruling family of the settlement.

The second principle brought from the rural context and which has a bearing on the formation of the informal settlement is that of the rights in land being governed by a system of "pyramiding over-rights", in which a number of parties have rights in the same piece of land, binding the holder to consult, persuade, notify or pay off other rights holders before transferring any of the land (Cross: 1994: 178). In the rural setting this would normally apply in respect of the chief's *induna* who is responsible for the allocation of land, the tribal officials above him, and the neighbours and other members of the community. Bacon *et.al.*(1981) state that the actual control of land in a rural Zulu settlement depends on the interaction of all levels of the tribe. The local land-holding cluster head occupies the level below the chief and his *indunas*, and all have to be satisfied in the process (*op.cit.*: 2-3). However, as Cross (1994) explains, in an established conventional urban informal area, new entrants come in "through a

process of sponsorship and screening, a truncated version of the rural process" (*op.cit.*: 181). Here the leadership of the settlement is invariably not the legal owner of the land, but he or she rules the settlement and is responsible for allocating land in it. From my observation and discussions it appears that this is the case in the conventional informal settlements on State land in the GEA (Shabalala, personal communication: May 1996).

A third principle of the traditional tenure system is the strong community base. Indigenous tenure in South Africa has a distinct character, and its emphasis is on residence rights being the link between the individual, the household, and the community (Cross: 1994: 178). In terms of Zulu custom, membership of a community is obtained by receiving land rights within it, and takes with it the obligation of ongoing active commitment to that community. Violation of this understanding may result in expulsion (*op. cit.*: 179).

From personal communication with Shabalala (May 1996), I have established that the tenure systems in operation in informal settlements in the GEA are not truly tribal in nature, but that "they are in the spirit of the customary tenure system" (*op.cit.*). When questioned further on what he meant, he replied that there is still the same community bonding, and access to the settlement is strictly controlled by the leaders in many settlements. However, because it is not a truly tribal area the leaders of the informal settlements do not pay allegiance to any chief. I deduced therefore, that there were no longer the full tribal pyramiding over-rights, as described above, in these conventional informal settlements and that the leadership of the community is now the 'end of the line', being the highest level, which the community believes, needs to be consulted and satisfied regarding land rights. The names and contact details of the leadership of each settlement therefore need to be recorded in the land records system, but those of the Chief do not.

The leadership in a conventional urban informal settlement is formed by a member or group of members of the settlement who can exert authority over others, either by force or in the form of political protection (Davies: 1998: 70). The number of individuals making up the leadership of a conventional urban informal settlement may vary between one person and a group of ten or more, depending on several factors such as the size of the settlement and the number of families in it, the age of the settlement, the

origin and history of the settlement, and intervention from outside forces, for example landowners or the local authority (Shabalala, personal communication: August 2000).

This statement agrees with the findings of Cross (1994) above, in that although the traditional ideas of land tenure have a very strong influence on the tenure systems adopted in conventional urban informal settlements, the underlying rights, and assumptions of rights, have affected the residents' thinking about land tenure. The current situation of the leadership of a conventional informal settlement controlling entry of new members to the settlement community, is merely a truncated version of the rural traditional customary process. According to Shabalala (personal communication: May 1996), the tenure system in operation in conventional informal settlements in the GEA is a modernised version of the Zulu customary land tenure system, although without the full pyramid right up to the chief above them. It is generally accepted that, because of the importance of land being a sign of belonging to the group, one of the most important principles of the adapted urban form of the customary tenure, in the urban context, and one which has to be very carefully controlled, is community control over the allocation of land within a settlement, especially to outsiders (Cross: 1994: 179; Davies: 1998: 70). This is enforced in practice by the leadership of the community. Outsiders wanting to enter a conventional urban informal settlement preferably require reliable contacts, but otherwise are interviewed by the leadership to establish both their political affiliations and where they have come from (Cross: 1994: 182-183, 185). This is also the case in the GEA (Shabalala, personal communication: May 1996).

A final principle of the traditional tenure system is that of fluidity of boundaries (Cross: 1991: 65). Although in the traditional tenure systems a man was allocated a piece of land for his and his family's residence, and further land which was for agricultural use, and possibly also access rights to the communal grazing land, the boundaries were not fixed precisely. These boundaries could, and often did, move, depending on the particular needs of the member of the community and his neighbours at the time. This aspect especially, would have a significant impact on the design of the land records system, if fluidity of boundaries is accepted as part of the land tenure reform programme.

I have shown that the Zulu customary land tenure system has influenced the *de facto* tenure system which is in place in the conventional informal settlements on State owned land in the GEA. The only variation is in the degree of adaptation of this Zulu customary land tenure system to the urban situation.

The tenure system in place in the urbanised conventional informal settlements discussed above is a modernised version of the traditional rural Zulu customary land tenure system (Shabalala personal communication: May 1996). On the other hand, where the settlements are more rural in nature, such as towards the extremities of the GEA boundaries, and on the rural land adjacent to the GEA, the more traditional form of the Zulu customary land tenure system is still in existence (*ibid.*).

For example, Shabalala (personal communication: May 1996), suggested that two tribal communities situated on the extreme western boundary of the PMTLC with Vulindlela, have spilled over the boundary into the PMTLC area onto the State owned Edendale Commonage (see Maps #1 and #2). This boundary is a series of straight-line cadastral boundaries, represented by imaginary lines and not clearly marked by fences or other features on the ground. Shabalala is unsure of the exact location of this boundary, and the communities appear to be totally unaware of its existence. Shabalala comments that these communities, who are known as the Noshezi and the Emgodini communities, appear to be more tribally oriented, and to operate in terms of the traditional Zulu customary land tenure system, under allegiance to the chiefs in the Vulindlela area adjacent to the GEA (*ibid.*). For these communities, and for those of the other more urbanised conventional informal settlements described above, the land records system should be designed so as to accommodate the effects of the rules of the traditional Zulu customary land tenure system which has influenced the land tenure in these settlements.

All this has implications for the design of the land records system. The land records system should therefore be designed to show the underlying freehold properties, and the registered owner thereof, in this case the State. In addition, the system should show the unrecorded land tenure rights in place in the conventional informal settlements on the ground, which as I have explained previously, are not parcel-based, and therefore should be captured by some appropriate method of ground survey or aerial mapping. This will show any overlapping rights, which can then be further investigated. For the adjudication of the rightful owner where there are overlapping land tenures, as mentioned above, a trail of legal evidence will be required and should therefore be captured into the land records system.

The land records system should also be able to accommodate those aspects of the informal settlement which are a result of the influence of the principles of the adapted urban form of the Zulu customary land tenure system, as these will be important to the residents of the settlement. Firstly, the system should indicate the community boundaries, as well as the limits of occupation of each family within these

boundaries, as these establish informal rights on the ground. As these are almost invariably totally unrelated to any existing cadastral boundaries which may have been surveyed on the ground, and registered in the Deeds Registry, the mapping of these established informal land rights on the ground should be done using appropriate technology (Davies and Fourie: 1998: 244), to provide the required information at an acceptable level of accuracy and at the lowest possible cost (refer to Davies: 1998: 20-28, for a discussion of this process).

Secondly, the system should identify and record, in addition to the registered owner of the land, the informal owner or leadership of the informal settlement or community in relation to the community boundaries referred to above, as well as the identity and personal details of this person or these people, as it is this person who should be contacted regarding any dealings in the land. Thirdly, the system should show any communally held land for grazing and other communal uses within the boundaries of the limits of occupation by the community. These informal communal land rights will also be mapped in a similar manner to the individual informal land rights of the community members as discussed above.

Finally, the system should be able to handle fluid boundaries, both around the community and within it, and should be able to show the changes in these boundaries over time. As described above, boundaries do change as the community's needs change. Therefore the individual boundaries of the land holdings of members of the community as well as those of the communally held and used land may change over time. The land tenure reform models chosen by the government may exclude this aspect of the fluidity of boundaries from the adapted urban form of the customary tenure rules, as it may be expected to be problematic, and to adversely affect the security of tenure of the settlement and its residents. However, the purpose of this dissertation is not to evaluate and comment on possible land tenure reform models, so for the purposes of the design of the system fluid boundaries should be accommodated.

The isolated PTOs, which are not parcel-based, but are nevertheless *de jure* land rights, must be taken into account and should be accommodated in the land records system. Their location and limits should be determined, as for the other non parcel-based rights, by some appropriate system of mapping.

The system of mapping these land rights should therefore be chosen, and the land records system should be set up, such that updating of the graphic representation of the boundaries, as well as the textual data

relating to ownership and other land rights can be readily recorded and updated in the system as changes happen on the ground, and in terms of the legal process.

5.3 Backyard Shacks and (Backyard) Shack-Farming on Private Land

There are also informal settlements in the form of shack developments on the formally surveyed properties in the GEA. They can be divided into two separate but similar types: firstly, backyard shacks on township properties, mainly on the privately owned properties in Edendale Proper or Plessislaer; and secondly, (backyard) shack farming on the larger privately owned freehold residential properties in the GEA, which is similar to the first, but on a larger scale. These two types can be clearly seen on Map #4 in Appendix A. Although backyard shacks are found on subdivisions held under inferior titles in (DDA) townships, this is isolated rather than common in the GEA (personal communication with Shabalala: May 1996). Therefore, this is not regarded as a settlement pattern for the purposes of this dissertation.

The two new concepts of 'backyard shacks' and '(backyard) shack-farming' require definition and description. Firstly, backyard shacks are informal dwellings which are erected on an existing property, usually in a township, where there is already an existing formal house on the property, for the purpose of housing more people, usually another family per shack. Cross (1994: 179) confirms that from her research, generally, this type of settlement usually occurs inside the formal Black towns, and arises when a landowner has surplus land. From my observation in the GEA, and confirmed by Shabalala (personal communication: May 1996), these may exist as single shacks, or two or three, depending on several factors, situated literally in the backyard of a property in a formal township. Some of these factors which determine the number of shacks per property are the availability of land, the demand for land, and the wishes of the landowner.

As mentioned above, these backyard shacks are not as common in the townships where the properties are smaller and they are fully developed with formal houses, such as Imbali, or Unit S or T, and in townships with higher-income residents, such as Unit J (see Map #3). However, they are very common in the much larger, private freehold properties of Dambuza and Machibisa (see Map #4). In many cases this land is closer to transport routes, municipal services, *etc.*, and so is very attractive for settlement.

Further, the registered landowner often encourages settlement on the land, for both economic and political reasons. The land is, in many cases, already densely occupied, unlike the vacant State-owned land described above, and negotiations with the landowner concerned have to take place. I argue that this is a further indication that the underlying legal tenure does affect the development of informal settlements in the GEA.

Secondly, the term 'shack-farming' derives from the rural situation where Black landowners tended to let their land to tenants and claim rent, rather than to farm the whole land themselves. This tenancy strategy by Black landowners became popular as it tended to provide them with a more consistently reliable source of income than agricultural farming (Surplus Peoples' Project: 1988: 197-200). There are no rural Black owned farms as such in the GEA, but many of the Black owned freehold properties in Edendale proper are of the size of small-holdings or large residential lots, and these are generally very densely settled with backyard shacks (see Map #4). In these situations I have used the term '(backyard) shack-farming'. This applies to the situation where the landowner also lives on the property and the tenant's shacks are literally in his or her backyard, as well as to the situation where the landowner perhaps owns several properties, lives on only one of them, and practices shack farming on the others.

Some sources do not agree that urban (backyard) shack-farming is an economic attraction for the land owner, as it is on the Black freehold farms where dense shack-farming is practiced and found to be more profitable than agricultural farming (Surplus People's Project: 1988: 201, citing Jenkins *et al.* (1986) on tenancy relations in freehold areas close to Durban). They conclude that, rather, in the urban areas there are other attractions. For example, the landlord has replaced the *induna* and is consulted by his tenants for help with various problems. In addition, as the importance of the landlord is enhanced by the number of people he controls, the more tenants he can put on his land, the greater the political power he will acquire (Surplus Peoples' Project: 1988: 201).

5.3.1 Landlord-Tenant Arrangement

I will discuss the land tenure arrangements in these backyard shack settlements. When a prospective informal settler wishes to settle on privately owned land, such as in Edendale proper, and parts of Plessislaer, he or she has to negotiate a tenancy agreement with the landowner.

According to Shabalala (May 1996), there are two different scenarios in such situations. Either the landowner rents a piece of his or her land for the tenant to construct a dwelling on the land, usually in return for payment of a (nominal) annual rental. Alternatively, the landowner may construct a dwelling of some sort and rent the structure to a tenant, in this case usually for a monthly rental. The former, known also as site-rental or 'tenancy at will', was the most popular form of informal tenure in Black owned freehold areas, generally, in 1983 (Surplus Peoples' Project: 1988: 201, quoting a report by Fourie (1986) on the 1983 Inkatha Institute Survey). The Surplus People's Project concluded that site-rental tenancy occurs only on freehold land, and not on tribal land. It also concluded that as this type of tenure is not found even on densely populated indigenous land, it is not a result of population pressure only, but rather the underlying form of legal tenure is a major deciding factor in the way informal tenures develop (Surplus Peoples' Project: 1988: 201-202), also confirming Cross' findings above. This point was also confirmed by Mr Shabalala (personal communication: May 1996). He stated that tenancy as discussed above occurs only on the freehold properties, and not on the State owned land.

However, in some cases the landlord-tenant relationships have become strained, as there are disadvantages for the tenants in the system. The main disadvantage is that the tenants have no stake in the land, unlike members of a community where a customary land tenure system is in existence (either in the full sense on tribal land, or in the adapted urban form on conventional informal settlements on State owned land) where, in terms of the customs, they would eventually obtain permanent rights in the land. This lack of permanent land rights leads to insecurity and doubt, for example, whether the descendants will be able to inherit and remain on the property (*op. cit.*: 200-203). During the late-1980s to early-1990s great expectations of land and housing were created in the minds of poor and homeless people by the emerging politicians who were preparing to take their places in the new government of national unity. When these promises were not met, tenants started to boycott paying rents, and many threatened their landlords to prevent retaliation (Bassett, personal communication: October 1998). The result is that many Black freehold landowners now cannot collect rent from tenants on their land, nor can they evict the non-paying tenants from their land. This culture of non-payment, which may affect the cost recovery efforts of the PMTLC in this area, was discussed above (see Chapter Two).

These shack settlements, whether the backyard shacks on the smaller township properties in the GEA, or (backyard) shacks-farming on the larger private freehold properties in the Edendale Proper and Plessislaer parts of the GEA, are informal. The development is also informal and the tenure relationships are unrecorded

versions of a landlord-tenant arrangement. These tenants are one class of the "current owners" on privately owned property in terms of the White Paper on South African Land Policy (South African Government: 1997b: 64) referred to above (in Chapter Two), and as discussed, the government's policies in the White Paper on SA Land Policy (1997) require that their land rights be recognised and formalised. As discussed above, in order to formalise any land rights the rightful owner has to be determined. That is, a process of adjudication should be put in place. In order to carry out a successful adjudication of land rights, all overlapping land tenure rights should be determined and recorded. The land records system should be designed to deal with historical data and to record the trail of legal evidence of sustained occupation of the land to facilitate the adjudication process.

The implications for the land records system are similar to the situation for the adapted form of the Zulu customary system, as there are people living on the ground who have seemingly acquired informal land rights in the land, and there are also the registered landowners, who have formal land rights in the same piece of land. The land records system should record both sets of these overlapping land rights, and the details of both the formal and informal rights holders. It should also, via appropriate mapping methods, show the informal boundaries around each informal land right and each piece of communal land. The overlapping rights in the land should be identified, adjudicated and targeted for rectification. For this purpose the land records system should be able to record historical data so that the trail of legal evidence of land tenure needed for the adjudication process can also be stored in the land records system.

5.4 Services

The services and infrastructure in these informal settlements with unrecorded tenure are in most cases non-existent, or insufficient. In conventional informal settlements on State owned land under *de facto* tenure, the local authority in many cases has not supplied services to these settlements, except that some form of water supply is provided to each household, if not through a piped service, then by water tanker on a daily basis. This method is regarded as an unsustainable means of water supply, and is instituted as a temporary measure only, until such time as either the informal settlement can be relocated to a location where it is possible to provide it with a piped water supply, or it becomes possible to supply piped water to the land (Greatwood, personal communication: June 1999).

In the case of backyard shack settlements on private freehold property, the services serving the property were intended for a single dwelling only, and are now overloaded as they are used by the tenants as well. The services are not sufficient for the landowners as well as the tenants on the properties, and need to be extended and/or upgraded.

Although the local authority cannot, in general, be responsible for the upgrading of all informal settlements within its area of jurisdiction, in particular those on privately owned land, I argue that it would be in the local authority's interest to collect data on all services which are in its area. Using a questionnaire-survey similar to the one carried out as part of the *Masakhane* information programme, the local authority could collect data from each household to establish the current position, and the projected estimates of consumption of the area (Greatwood, personal communication: June 1999). This would facilitate the planning and management of the PMTLC's services in the area, and where services are being used, identify each occupants' obligation for payment in respect of rates and taxes due, and for municipal services consumed. The information would also facilitate the upgrading of any aspect of the informal settlements, including land tenure and services, and for the general management of all informal settlements in the TLC area.

As this is an issue which will affect the community closely, they should be involved in discussions and planning of the upgrading, and the level of service to be provided. In such cases it is important for the landowners, tenants and the PMTLC representatives to meet to negotiate a way forward, and to gauge the community's needs, as well as their affordability levels.

The implications of including data on services in the design of the land records system are that it should record the positions and details of the existing municipal service networks, as well as private connections into these services. In order to accommodate the large amount of data from the questionnaire-survey, and be able to carry out spatial relationship queries on it, the land records system should have full GIS functionality. To facilitate community involvement in the planning and negotiation processes, the needs of the community in general, and the affordability level of each household individually, should be determined and recorded in the system. Furthermore, the land records system should have a user-friendly interface and an output which provides the information in a format which is understandable and useful to the community members.

5.5 Conclusions

I have shown that conventional informal settlements on State owned land, and the backyard shack settlements on township land and larger properties in private freehold ownership, are as a result of the past governments' policies for Blacks. I have shown that they are under informal unrecorded tenure, and that the services are informal and insufficient for the number of people now using them. These settlements should be upgraded in terms of the present government's land tenure reform and upgrading policies described above (see Chapter Two). To manage these settlements, and facilitate the upgrading process, I am arguing that the PMTLC should establish and manage an appropriate land records system.

The upgrading of these informal settlements would involve the four processes described above (in Chapter Two), namely land delivery, land tenure reform, provision of services, and cost recovery. Although only land tenure and service provision issues were discussed in this chapter, the other two processes mentioned automatically become part of the upgrading process if land tenure reform and the upgrading and provision of services are dealt with. As argued throughout this dissertation, an appropriate land records system is required to be established and managed at the local government level to manage and facilitate the upgrading processes, and the design criteria for this land records system is the main focus of this dissertation. The implications of these necessary upgrading measures identified above on the design of the land records system should be determined.

The land records system should therefore be designed to record the existing underlying registered freehold land rights, including the name and details of the registered land owner, as well as the informal unrecorded land tenure and the name and details of the holders. This informal land tenure, both on the State owned land and the privately owned land, is not parcel-based. Therefore the individual holdings cannot be recorded in the same manner as the underlying formal land rights, but will have to be determined by a combination of some appropriate form of mapping, and some further investigation and adjudication process on the ground. In this way the land records system can provide the information required for planning the formalization and upgrading of the land tenure in these settlements. I have already discussed above the importance of a trail of legal evidence, which is needed in the adjudication process of land delivery, to trace the historical developments and to build up a case for the established unrecorded land rights. The land records system

therefore, should be designed to record the historical data related to past and present land tenure on the land.

The land records system should accommodate the most important aspects of the adapted urban form of the Zulu customary land tenure system which is in operation in the conventional informal settlements on State owned land under *de facto* tenure. To do this the land records system should, firstly, record occupation patterns on the land. That is, independent of any surveyed parcels which may exist on the land, the extent of actual occupation of the community as a whole, and of each member (household) of that community should be recorded. Secondly, identify and record in the system the identity of the community, as well as the details of the head or leadership of each community, and in addition, the identity and personal details of each member (head of each family or household). Thirdly, identify and show in the land records system, any communal land for grazing. Finally, the land records system should accommodate fluid boundaries.

In addition, the land records system would also have to accommodate the unrecorded landlord-tenant arrangements in existence on the privately owned freehold land. The requirements for such a system are similar to those for the *de facto* land tenure system discussed above, in that the land records system should record, in addition to the formal cadastral and registration records, the extent and details of any informal land tenure which may exist on the land. The extent of this informal land tenure is totally independent of any formal cadastral boundaries which may exist on the property, and would have to be determined on the ground by appropriate survey or mapping techniques, incorporating adjudicatory principles into the process. To facilitate the adjudication process, the system should be able to record the trail of legal evidence, or historical data, of the land tenure on the property. The system would also have to be able to record the identity and personal details of the head of the household of the tenant family, and the pertinent aspects about the landlord-tenant agreement.

Further, to show the current servicing network, the land records system should record the existing municipal services serving the communities, as well as the formal connections and any informal extensions of these within the properties. Considering the shack settlements on private freehold land, it might be argued that the local authority should not become involved and should leave the upgrading of the area to each respective private land owner. However, I argue that from a planning and management of municipal services point of view, as well as the cost recovery aspect, the local authority, as service provider, should have information

about its services, such as their positions, their condition, and the load they are carrying. That is, the number of people that each is serving and the consumption levels of each service should be recorded. This indicates the necessity for a questionnaire-survey of each household, as the PMTLC has done as part of its *Masakhane* information programme. In order to analyse the spatial relationships of the data, it is necessary that the land records system possesses a fully relational spatial data base.

Finally, the land records system should be flexible and easily updated so that it can show the changes in the *de facto* tenure boundaries or limits of occupation as they occur, whether as a result of the movement of the informal boundaries, changes in occupation patterns, or the upgrading of informal land rights, and new or upgraded services, to facilitate the ongoing management of the settlements.

CHAPTER SIX

LAND INFORMATION SYSTEMS

6.1 Introduction

To manage the upgrading (land tenure and services) of informal settlements in the GEA, and to ensure that this process is successful and sustainable, the local government structure, in this case the PMTLC, should develop an appropriate land records system. I will show that this should be based on the concept of the multipurpose cadastre, with relevant and current data about the settlements, the people in them, and a record of their tenure relationship with the land they live on. I will show that the term 'land records system' chosen to describe the system to manage the upgrading of land tenure and services in the GEA is appropriate as it will be a combination of various types of systems.

In the previous chapters I have identified aspects which should be included in such a land records system to be designed. In this chapter I shall examine the theory behind land information systems in general, with particular attention to the design of an appropriate land records system for the management of the processes involved in the upgrading of land tenure and services in informal settlements in the GEA.

From a review of literature on the subject, I will begin by discussing land information systems in general, including an explanation of some LIS/GIS terminology used, and comments on problems of dealing with land rights in a LIS. I will also discuss the four principal components of land information systems. Thereafter I will discuss a common type of land information system, the multipurpose cadastre, and show it is an appropriate form of land information system to serve the intended purpose for the GEA, but that it has certain shortfalls. I will discuss the need for the incorporation of customary tenure and historical data into such a system, and stress the need for the system to be user-friendly and accessible to the communities it is intended to serve. I will therefore conclude that the appropriate land information system

for the purpose of managing informal settlements and their upgrading processes (tenure and services) in the GEA, should be a land records system, based on the concept of a multipurpose cadastre, but which should go beyond this and include some aspects which would not normally form part of a multipurpose cadastre, namely non-parcel-based land tenure and historical data..

In conclusion, from the discussions in this chapter and previous chapters, I shall identify the five main themes which should be covered in the design of the land records system for the GEA. These are firstly, that the land records system should be based on the multipurpose cadastre; secondly, that the system should also be able to accommodate non-parcel-based tenure and the tenure rules of the adapted form of the Zulu customary land tenure system in existence in conventional informal settlements under *de facto* tenure in the GEA; thirdly, that the system should incorporate temporal GIS technology so that it will be able to accommodate the historical trail of legal evidence of sustained occupation of the land; fourthly, that the land records system should be accessible to the public in the GEA, both in terms of location and cost of accessing this information; and finally, the land records system should be sensitive to the users' needs and should be user-friendly, both in its interface with the users, as well as in its storage and output modes.

6.2 Land Information Systems in General

There are many definitions of the concept of the land information system . Barnes argues that it is very difficult to define land information systems in a concise and definitive manner, due to the "rapid development of these systems over a relatively short period", their multi-disciplinary nature, and the different perspectives adopted by various professionals from different disciplines (Barnes: ND: 1-2).

Dale and McLaughlin (1988: 8) define an **information system** generally, as "a combination of human and technical resources, together with a set of organizing procedures, that produces information in support of some managerial requirement", and add that a **land information system** "gives support to land management by providing information about the land, the resources upon it and the improvements made to it" (*loc.cit.*). More descriptively, Antenucci *et al.* (1991) describe a **geographic information system** (GIS) as an information system which can, firstly, collect, store and retrieve information based

on its spatial location; secondly, process spatially related data within a targeted area so as to identify locations which meet specific criteria, explore relationships between data sets and analyse related data spatially; and thirdly, to display the data relating to a selected area graphically or numerically, before and/or after analysis (*op.cit.*: 7). The concepts and principles of LIS and GIS are very similar, the main difference between the two being that generally the data in a GIS is not parcel-based as in a LIS, but is related to a natural or man-made resource (Barnes: ND: 2). Many authors agree that one of the major requirements of a land information system is that it should also contain data relating to the possession of land rights, including their nature and extent (Ezigbalike *et.al.*: 1995: 4; Barnes: ND: 2). Based on these definitions I am arguing that a form of land information system, incorporating some aspects of a geographic system, would be appropriate for the GEA.

6.2.1 LIS/GIS Terminology

It is necessary to describe and explain the LIS/GIS terminology used in this dissertation for the benefit of the reader who is not entirely familiar with such terminology:

Adjacency- see Topology

Attribute data- (or non-spatial data) is that data which describes the spatial aspect and related characteristics of the spatial data element or feature (Chilufya: 2000; and personal communication with M Chilufya, November 2000).

Connectivity- see Topology

Element- a basic spatial object such as a point, line or polygon representing a feature on the ground or an imaginary object such as a cadastral boundary [a point is a zero-dimensional spatial object, a line is a one-dimensional object linking two points, a polygon is a closed figure made up of a single curved line or a series of lines] (*loc.cit.*).

LIS/GIS procedures- activities required for the acquisition, modeling, storage, retrieval, manipulation, analysis and presentation of spatial data (*loc.cit.*).

Node- a point with more than one line terminating at the point (*loc.cit.*).

Spatial data- data associated with a location on some reference system, typically a location on the surface of the earth (*loc.cit.*).

Topology- spatial relationships between elements or spatial objects, including connectivity, adjacency, overlapping and containment [***connectivity*** relates to whether two lines intersect or not, ***adjacency*** is a neighbour relationship and includes an identification of whether one element is to the left or the right of another, ***overlapping*** is a relationship similar to connectivity but usually relates to polygons, ***containment*** is the relationship between two polygons which determines whether one polygon is contained within another polygon] (*Loc.cit.*; Dale and McLaughlin: 1988: 144-145; Antenucci *et al.*: 1991: 94, 98-99).

6.2.2 Land Rights in an LIS

Regarding the issue of land rights, it is noted that traditionally most land information systems were set up for western or developed countries (Ezigbalike *et al.*: 1995: 14), and therefore most land information systems are based on this assumption, where data and information are related to the land parcel (Barnes: ND: 2; Arrowsmith: 1989: 11). That is, the typical western land information system is based on the cadastre and has adopted the land parcel as the "basic organisational unit for referencing land tenure data and information", with all other data sets of spatial and non-spatial data being linked to this organisational unit (Ezigbalike *et al.*: 1995: 4). Such a land information system, which is based on the cadastral land parcel and which contains additional attribute data linked to the land parcel, is referred to as a multi-purpose cadastre (see Para 6.4 below). However, as I have shown, there are substantial informal settlements in the GEA where land parcels, if they exist, have no significance. In such settlements there is unrecorded land tenure, where the tenure rules of the Zulu customary land tenure system, in its modernised urban form, apply. I will show below that the spatial records of land rights which are not related to a defined parcel of land should also be accommodated into the land records system, to record these hitherto unrecorded land rights.

I will now discuss the principal components of a land information system in general, before going on to describe the multipurpose cadastre in more detail, and investigate its relevance for the GEA.

6.3 Principal Components of a Land Information System

In general a land information system may be thought of as having two sub-systems - an institutional sub-system and a technical sub-system. These two sub-systems comprise the four principal components of any LIS, being firstly the people involved (the institutional sub-system), and secondly a data base; thirdly the technology, including for example CAD or LIS/GIS; and finally, the procedures, standards and protocols for the exchange of information (all making up the technical sub-system) (Barnes: ND: 2; Latu *et al.*: 1996: 145-148). I shall discuss these four principal components, and from these I shall deduce implications for the design of the proposed land records system for the GEA. These four principal components also accord with the definition quoted above of (an information system and) a land information system by Dale and McLaughlin (1988), and of a GIS by Antenucci *et al.*(1991). From my involvement with the design and implementation of the land information system in the Pietermaritzburg-Msunduzi TLC, together with some general background information from material such as Barnes (ND), Dale and McLaughlin (1988), Zwart (1986), Latu *et al.* (1996), Antenucci *et al.* (1991), Seaborn (1995) and Ezigbalike *et al.* (1995), I will elaborate on these four components and the important aspects of them with respect to the design of a land records system for the GEA.

6.3.1 People

The people involved in a LIS, making up the institutional sub-system, are the most important component and determine the "effectiveness, pace and success of development" of the system (Dale and McLaughlin: 1988: 235- 236; Latu *et al.*: 1996: 145, 148). The people involved include the users of the system, the people who operate and maintain the technical part of the system, the people who produce the data and information, and the managers who look after the system (*loc. cit.*).

The users are the most important group of people, and comprise anyone who accesses the information, either within the organisation which owns the land information system, or from the wider community it is intended to serve. The users should have a significant impact on how the land records system is

designed and set up (Latu *et al.*: 1996; Zwart: 1986). The identification of the users and their needs, and the potential problems and pitfalls will be dealt with in further detail below.

The producers of the data are those people who collect or capture the data in the correct format for the system's requirements, and includes, usually those people within the organisation which owns the information system, but may also include people outside of the organisation, who produce any data which are to be stored. An important aspect of the capture of data is that it also includes the on-going maintenance of the data, and the people who will carry out this function should also be identified as producers (Dale and McLaughlin: 1988; Latu *et al.*: 1996). As such, I will show below that the producers are often included in the users, as they include many common people. In the case of informal settlements in the GEA, I will show that people within the communities should be involved in the collection and ongoing maintenance of the data (see Chapter Seven).

An important aspect of a LIS is the establishment of a management structure to provide leadership and direction for the design, implementation and maintenance of the system and its various components. It is generally accepted that for an information system to be successful and sustainable in an organisation, the information system must be fully supported by top management in that organisation, and there should be a clear strategy for the design, implementation and on-going maintenance of the LIS (Dale and McLaughlin: 1988; Latu *et al.*: 1996). I shall not discuss the management people or structure any further.

6.3.1.1 The Users of a Land Records System

Latu *et al.* (1996), as a warning, quote many examples of systems which were designed and developed in accordance with the bureaucratic and top-down approach of traditional information system development, where the system is pre-specified, which in turn leads to a pre-determination of who the users are and what their requirements will be. In their examples management determined the priorities for development of the system without communication with the operational users (*op. cit.*: 146- 147). In many of these cases the development of the system failed - it was either aborted or postponed, or the system delivered products which were never used, or the system fell short of expectations and never reached completion (*op. cit.*: 148).

Latu *et al.* (1996) therefore warn against adopting the "bureaucratic and structured top-down approach" (*op.cit.*:146) typical of western land information system design, especially when designing a system such as the land records system for the GEA, where cultural issues may be involved and where some of the users of the system are non-experts. They stress that the users must be involved in all stages of the design and development of the system (*op.cit.*:150) so that the system accommodates their needs and makes the information ultimately "readily available in a processable format" (*op.cit.*:146). "Identifying the users and their requirements, and understanding their culture" are essential to the design of a successful and sustainable land records system (*op.cit.*: 150). In other words the LIS, the information contained within it, and the format in which it is stored and presented, should be demand-driven, according to the users' requirements and their cultural issues (*op.cit.*; Zwart: 1986).

As mentioned, it must be clear who are to be the users of the system. Latu *et al.* (1996) define two sets of users: the immediate users and ultimate users of the land information system. The first group are those who are involved in collecting, storing, processing, retrieving and analysing data and finally producing the required information, either for their own use or for someone else. It will be recognised that this first group includes the producers of the data identified above. The ultimate, or end, users are those who request the data from someone else for their own use, and this group would include the general public, land developers, and so on (*loc.cit.*). I will identify below (and see Chapter Seven) the users in the land records system for the GEA, and build their involvement into the design of the land records system for the GEA.

Once the users of the system have been identified, however, determining their needs in practice, is not a simple exercise. There are five potential problem areas in identifying users' needs or requirements. These are: firstly, most users are not familiar with the technology and may have difficulty in identifying and explaining their needs; secondly, their needs are seldom static, but will change over time as they become more familiar with the concepts; thirdly, the effectiveness of the communication between the users and the systems analysts; fourthly, the functional expertise of the user; and finally, the user's perceived benefit from the proposed system (Latu *et al.*: 1996:151-152; Zwart: 1986:124).

A careful analysis of the needs of the users is therefore the first step to success of a land information system (Latu *et al.*: 1996; Antenucci *et al.*: 1991). The needs of the users should be determined by interviewing the users, conducting workshops, distributing questionnaires, and by an analysis of the

results of these above efforts, current operations and a projection of future conditions (Antenucci *et al.*: 1991: 216). The analysis of needs should include aspects such as data processing functions required, the format and content of the data, other data sets to which links should be made, system applications and products required, software functionality required, hardware devices and capacities as well as communication facilities, and the types of output of information required (*loc. cit.*). When the users are able to participate in the design and development process, they have the opportunity to "identify, modify and refine their needs and interests", but for this to be effective there should be a feedback mechanism in place (Latu *et al.*: 152). Furthermore, by creating a sense of part-ownership by the users of the land records system, the benefits of user participation are that it improves user satisfaction and secures user support for the system, and helps alleviate user resistance to the changes which the development of the system is bound to bring about (*loc.cit.*).

Finally, in addition to identifying the users and their needs, the system should be designed to be easily accessible to the users, in terms of "location, cost and user-friendliness" to ensure its success and sustainability (UNECA: 1998: 10). The user-friendliness of the system is related directly to accessibility. It must be borne in mind that most of the users in the GEA are poor, and many are also uneducated and illiterate.

Accessibility is premised on the technologies involving user-friendly computer interfaces and outputs, and the transfer of digital information to remote computer workstations. Technologies are available which facilitate a user-friendly interface with the user and for an appropriate and user-friendly output. Especially in areas where customary tenure or an adapted urban version of customary tenure is in place, the concept of visualisation should be employed for users or decision makers to view the outputs (*op.cit.*: 18, 28). This concept of visualisation entails base mapping which should be uncluttered mapping, where only the essential features are shown. Major physical features and landmarks, commonly used place names, and evidence of human settlement should be sufficient to be shown in most cases (*loc.cit.*). Regarding the transfer of digital information, the technology required to transfer the information from a centrally located land records system to remote workstations already exists and is advancing continually.

As mentioned above, accessibility to the community also implies community involvement in the operation of the system and ongoing maintenance and the updating of the data to keep it current. Local community members should be trained to carry out these functions. Community members should also be trained as land administrators, guided by professionals in the local authority, to collect the necessary information to maintain the currency of the data (Fourie: 1998b: 59-64). In this way the range of users of the land records system would be shifted out of the ranks of the property professionals and the local authority technical officials, which is normally where the main users of most land information systems are, to include the communities who are affected by the decisions made. For this reason the users in the communities must be identified and trained, and the system must be designed to ensure user-friendliness and accessibility in relation to these users.

6.3.1.2 Conclusions

From my experience, and confirmed by Latu *et al.* (1996), Zwart (1986), Dale and McLaughlin (1988), UNECA (1998) and Antenucci *et al.* (1991), a factor often overlooked by an organisation when setting up such a system, is that, even if the latest technology is employed in the system, if the needs of all the people involved are not met, the system is unlikely to be successful and sustainable.

Therefore, in the case of the land records system for the GEA, there must be leadership in the management of the system and this leadership must ensure that, firstly, all the users are correctly identified and their needs, including any cultural issues, are determined and evaluated and accommodated in the design of the system. As culture will affect the way the users think about and relate to the information, and the land records system as a whole, the cultural issues should not be overlooked, but should be incorporated into the design and development of a land records system. Furthermore, there must be qualified, skilled and trained people in place to operate and maintain the system, to collect and capture the data into the system and to provide the ongoing maintenance of these data.

6.3.2 The Data Base

The data base, or information base as it is sometimes referred to, is a vital component of the LIS. It is for the storage, manipulation and retrieval of the data. The data base should be designed and structured to store the data efficiently so that the data, or any combination of parts of it, can be easily and quickly

retrieved for viewing or to process queries. For example, there should be a relational data base management system (RDBMS) which is structured so that the user can choose to access the data in any data set, or query any spatial relationships between various data sets stored in, or linked to, the system (Antenucci *et al.*: 1991; Intergraph: 1998).

I have argued above that the database for the land records system for the GEA should have full spatial relational capabilities so that it can process queries relating to topological spatial relationships, such as adjacency and connectivity. This implies that the data base for the land records system for the GEA should include linkages between all data sets, and even separate data bases in the PMTLC (Antenucci *et al.*: 1991; Intergraph: 1998; Seaborn:1995).

The data base requires effective administration to protect the integrity of the data, for example, access control to the data base to restrict access to view and modify data for certain authorised users. Furthermore, quality and accuracy standards need to be monitored, and procedures for the back up of the data need to be established (Antenucci *et al.*: 1991: 99-102).

Finally, ongoing data base maintenance is essential to a successful land information system, to update the system data base with any changes which have occurred, due to events or natural changes. The easy updating of the data in the land records system has also been identified as one of the design criteria of the system, to reflect changes such as upgraded land tenure, new development and their land tenure details, and new or upgraded services. Antenucci *et al.* (1991: 109) explain that data base maintenance includes procedures to identify changes and changing conditions, and these should be incorporated into the operating procedures of those who operate and manage the land information system. Therefore, data base administration policies and data base maintenance procedures need to be established in the design of the land records system for the GEA to ensure the integrity of the data base and easy updating of the land records system.

6.3.3 Technology

Land information systems can vary in complexity and level of sophistication. Ezigbalike *et al.* (1995) state that technology is not as important as systems and processes (*op. cit.*: 4). Latu *et al.* (1996) state that technology is not as important as the people component (*op.cit.*:145). Nevertheless, some

appropriate level of technology is required. At the least-complex end of the scale, the system would be a completely paper-based system, where all data is contained in paper plans, maps, records and files, and the various sets of data are cross-referenced manually for easy access. Higher up the scale of complexity may be a mixed system, where part of the data is computerised, and where there would be references to paper records or plans, or other computerised data bases, for other parts of the data. Where spatial data is computerised, it may be stored as CAD drawings, or it may have the attributes of a true LIS/GIS with a structured relational spatial database incorporating topological relationships and links between the various spatial and non-spatial data sets. I will show (see Chapter Seven) that the land records system for the GEA should have such a relational spatial data base so that queries relating to topological spatial relationships can be processed. Such queries are very useful for planning, and planning is critical for any upgrading programme.

The most complex level of LIS would be a modern, fully computerised system, with a structured relational spatial database incorporating full topology and links between the various related data sets, and where the system can process queries relating to any of the stored data sets and output them in the chosen format. A benefit-cost analysis would decide whether it is expedient to convert a particular set of plans or a data base into an appropriate digital format to enable total integration into the system, or whether to retain it in its original format and to include a reference or linkage to it in the land records system (Dale and McLaughlin: 1988; Seaborn: 1995). I will show (see Chapter Seven) that the land records system for the GEA should contain links to remote data bases, but in respect of plans or documents which need to be accessed only from time to time, these should remain as paper-based information and should be cross-referenced in the system, but their seldom use would not warrant full digitisation into the land records system.

6.3.4 Procedures, Standards and Protocols

For the system to be successful and sustainable, procedures, standards and protocols should be adopted and put in place for the capture, storage, presentation and exchange of data (Dale and McLaughlin: 1988; Ezigbalike *et al.*: 1995). Without these the data may be inefficiently captured, stored and presented, it may be impossible to import other data sets into the system, or it may not be possible to process a query involving all the data sets, and as a result the system will not be useful to the intended users (*ibid.*). The procedures, standards and protocols are another crucial component of the land records

system for the efficient running of the system, and should be included in the design criteria of the land records system for the GEA. However, I shall not discuss these any further in this dissertation.

6.3.5 Conclusions

The four principal components of a LIS discussed above are all critical for the success and sustainability of the LIS. However, the technical operations of a modern LIS are becoming increasingly routine and straight-forward, including the storage and retrieval of data, the manipulation of the data to create queries, and the output of the information in the required format - the institutional issues surrounding the people are still the major constraining factors which require a great deal of attention, especially in the design stage (Latu *et al.*: 1996: 145). Strategic decisions should be made, when designing the land information system, regarding the four principal components, and the relative levels of resources available for each. These will be discussed further below (see Chapter Seven) in relation to the design and development of the land records system for the GEA.

I shall now discuss the characteristics of the multipurpose cadastre, and I will show that such a system should form the basis of the land records system for the GEA. However, I will also show that there are some data sets which are not usually associated with a multipurpose cadastre, which should be included in the land records system. I shall conclude that a land records system which includes a modified form of multipurpose cadastre with additional types of data and information as a result of new thinking on the subject, as suggested by Fourie and van Gysen (1996: 358), is appropriate for the management of informal settlements in the GEA.

6.4 The Multipurpose Cadastre

The concept of the multipurpose cadastre has received international attention for its ability to facilitate land management by recording a range of land information, especially that related to the registered ownership of land, and making it readily available to those who need it (Fourie and van Gysen: 1996:355). I am arguing that this approach is necessary, but not sufficient, for managing land information flows in the GEA.

Dale and McLaughlin (1988: 63) define the multipurpose cadastre as "a large-scale community-oriented land information system", where the cadastral parcel is the "fundamental unit of spatial organisation", and various land information "such as land tenure, land value and land use" are related to this parcel. Such a system is, wherever possible, "complete in terms of spatial cover", and "provides a ready and efficient means of access to the data" (*loc.cit.*). A multipurpose cadastre may also contain, or link to, information such as land tenure, land value, land use, geological, geophysical and hydrological, services and planning controls, and may support such functions as land transfer, land taxation, town planning and general administration, by providing the relevant land-related information necessary for each of these functions in an integrated form (*op.cit.*: 63-78). I will show below that the land records system required for the management of the informal settlements in the GEA should be based upon the concept of a multipurpose cadastre, but needs to go beyond the conceptual framework of the multipurpose cadastre formulated by Dale and McLaughlin above.

There are five tools associated with a multipurpose cadastre, namely the multiple layers of the spatial data base, the geodetic reference framework (GRF), the non-spatial attribute data, the unique parcel identifier, and the integration of the various data bases making up the system. I shall discuss each of these five tools briefly. Firstly, the spatial data base of the multipurpose cadastre consists of a number of layers, and the various spatial data sets are stored on individual layers (Barnes: ND: 7-8, Dale and McLaughlin: 1988: 65). Secondly, the fundamental layer in a multipurpose cadastre is the geodetic reference framework (GRF), which forms the spatial foundation of any land information system or geographic system, and which permits the spatial referencing of all spatial land data in the system, so that the spatial relationships between separate objects in the land or geographic information system can be interpreted (Barnes: ND: 8-9, Dale and McLaughlin: 1988: 65). Two other fundamental layers of the multipurpose cadastre are the cadastral parcel layer, and the topographic layer (Barnes: ND: 12-15, Dale and McLaughlin: 1988: 65, 67-72). With these two tools, that is the GRF and the various layers, the user of the system may choose and combine the layers he or she wishes to view or output together, and may leave off those which hold no interest for the particular purpose. Thirdly, as mentioned above, a further tool of a multipurpose cadastre is that, in addition to spatial land information which is related to the geodetic reference framework, it also contains non-spatial or attribute data in files stored in the data base (Dale and McLaughlin: 1988: 63, Antenucci *et al.*: 1991: 85). Examples of such alpha-numeric data files, are ownership records, a record of land uses, socio-economic data, and the status of services.

Fourthly, there is a tool known as the unique parcel identifier which identifies a land parcel on the cadastral parcel spatial layer and links or cross-references any other data to the parcel (Dale and McLaughlin: 1988: 65). Finally, the fifth tool associated with the multipurpose cadastre is the integration of the system, together with its various data bases, and maintenance procedures. That is, the main central data base should possess relational data base characteristics (Antenucci *et al.*: 1991: 96), and link through an integrated system to all other data bases, some of which may be paper-based (Dale and McLaughlin: 1988: 63, 65), and data base maintenance procedures should be established for the easy updating of data in the system (Antenucci *et al.*: 1991: 109-110). Examples of these linked data bases, which would also comprise spatial and attribute data components, would be records of the relevant municipal services, such as water and electricity supplies, and road, sewer and stormwater networks (Dale and McLaughlin: 1988: 76-78). Services data will be discussed in a little more detail below.

The data held in a multipurpose cadastre is partly concerned with the physical attributes associated with each land parcel - both man-made such as the buildings, pipelines and structures on it, and natural features such as the vegetation, water courses, and geology - and partly concerned with the abstract attributes of the land parcel, such as its boundaries, dimensions, land value and land use. Some of these data sets mentioned may not be included initially, and may be captured and included later, or not at all. The data contained in the multipurpose cadastre may be viewed separately for each land parcel, or it may be viewed collectively by grouping together several parcels with same or similar attributes, and displaying them as a homogeneous group (*op.cit.*: 66), for example the analysis of the water availability, sewerage availability, and housing/structure types shown on Maps #7, #8, and #9, respectively (see Appendix A).

Normally a multipurpose cadastre would record the cadastral parcels and ownership data in respect of these properties recorded in the central deeds registry. However, due to the existence in the GEA of many instances where there are overlapping land rights, inferior recorded land rights, and other forms of informality which exist in respect of formal cadastral parcels, both State owned and privately owned (see Chapter Four), the land records system should record the status of the land right which exists. That is, in respect of formal cadastral parcels, the status of the land right is not a simple choice of 'registered' or 'not registered' - there are more options available on the continuum of formality-informality as described above, such as deeds of grant, leasehold and some PTOs (see Chapters Three, Four and Five).

Referring again to the definitions of a multipurpose cadastre by Dale and McLaughlin (1988), Barnes (ND) and Antenucci *et al.*(1991), and the tools as defined above, and considering the requirements for the design of the land records system for the GEA identified in this and the previous chapters, I conclude that the land records system for the GEA should incorporate this framework. However, as I will show, the land records system should go beyond the usual design criteria of a multipurpose cadastre as described above, and should also accommodate non-parcel-based tenures and temporal data, so that the informal settlements under customary tenure, and the trail of legal evidence of sustained occupation and rights in the land, respectively, can be accommodated in the system. I will show below (see Chapter Seven), that the framework of the multipurpose cadastre, together with the additional data capabilities of accommodating non-parcel-based tenures and historical data, fully meet the information requirements for a land records system to manage the upgrading (tenure and services) of the various informal settlements in the GEA.

6.4.1 Incorporating Customary Tenure

Increasingly, people who are interested in developing countries are trying to adapt the concept of the land information system to better suit their non-western circumstances. Rakai for example defines a LIS as "an inquiry network of land related information", and points out that although LIS has been largely based on the cadastre because it has been mainly used for land administration purposes, it need not necessarily be so based (Rakai: 1994: 765/2). She argues that the concepts of customary tenure can be incorporated into the western based LIS technology.

Ezigbalike and others have also researched and investigated the possibility of incorporating customary tenure into LIS. They note that when western cadastral concepts and LIS are introduced into communities with customary land tenure systems, there are generally cultural costs (Ezigbalike and Benwell: 1994; Ezigbalike *et al.*: 1995: 21). It follows that the "cultural dimension" should therefore be considered and incorporated into the LIS, in order to ensure that the LIS will minimise the cultural costs, and address the needs of the community it is meant to serve (Ezigbalike *et al.*: 1995: 14). A number of international authors have concluded that customary or communal tenure can and should be successfully incorporated into a land information system, but that sufficient care should be taken in the design of the system so that the customary interests in land under these land tenure systems are accurately recorded, without distortion (Ezigbalike *et al.*: 1995: 21; Latu: 1995: 34; Rakai: 1994: 765/10). Therefore, the

conventional informal settlements of the GEA which are under the adapted urban form of the Zulu customary land tenure system should be able to be included in the land records system. However, care should be taken to preserve the cultural values of these land tenure rules in the system, as stressed above.

A potential solution for including customary tenure into the land records system, is to establish a dual tenure system, as has been done in many developing countries. A dual land tenure system is a system where "some lands are held under Western/European laws, while others are held under customary laws" (Ezigbalike *et al.*: 1995: 6). I argue that such a dual system would be suited to the variety of land tenures in the GEA, and is recommended from a land administration perspective. This is because, although the entire area is covered by surveyed land parcels which are recorded in the formal freehold cadastral and registration systems, there are many cases of overlapping informal land tenures throughout large areas of the GEA, much of this being held under the adapted urban version of customary tenure. In such a dual system, the parcel-based formal land tenure rights will continue to be indicated in the system as relating to an individual land parcel, but in the case of the non-parcel-based modernised or adapted customary tenure found in the GEA, the land rights will relate to the informal tenure. In some instances the informal tenure will relate to a piece of land demarcated by fences, hedges, *etc.*, the positions of which can be determined by a suitable method of mapping or ground survey (see Chapter Five). In many instances, however, the informal tenure relates to the individual house/structure, the position of which could be similarly determined and represented by a co-ordinated point on or close to the house/structure (Latu: 1995: 25-33). It will be recognised that this is the same concept as described in the mid-point land tenure reform option (see Chapter Two). This location-based (rather than parcel-based) reference for informal tenure holdings under customary tenure (or the adapted urban form of customary tenure, in the case of the GEA), is sensitive to the cultural values of the people and their customs, as it depicts the position of the land holding as a point only, and not a fixed area demarcated by straight line boundaries (Latu: 1995: 31-34).

Alternatively, as the informal tenure rights actually relate to a house/structure which exists on a formal cadastral land parcel (although there may also be several other houses/structures on the same parcel), and as the land parcel will be recorded in the dual system, the unique identifying number for each house/structure could contain a reference to the cadastral land parcel on which it is situated, without compromising the cultural values and customs of the people living there. As such, a cadastral land parcel

could form the so-called 'outside figure' for a number of houses/structures on it, and all these informal land rights would relate to the cadastral land parcel. An outside figure could refer to an existing land parcel, or to a more meaningful parcel created to contain a family group or community. This would thereby give a community or family contained within an outside figure security of tenure, as a whole, from outsiders. It will be recognised that this proposal satisfies many of the requirements of the government's land tenure reform policies discussed above (see Chapter Two).

6.4.2 Incorporating Historical Data

Another aspect of land information systems which should be considered for inclusion into the design criteria of the land records system for the GEA, concerns the accommodation of historical data. This involves the capture of another dimension of data, being temporal data, in addition to the spatial data and the attribute data which normally make up a land information system (Hermosilla; 1994, 122). I have stated on several occasions above (see Chapters Two, Four and Five), that the land records system should record the trail of legal evidence of sustained occupation of the land in order to facilitate the process of adjudication of land rights and to determine the rightful owner of a piece of land. This requires the incorporation of temporal GIS (TGIS) technology into the design of the land records system, and the capture of relevant historical data. Temporal GIS is "an attempt to store and analyze spatial objects and changes in their attributes through time" (Castagneri: 1998). "(T)he attraction of a TGIS is its inherent ability to track, analyze and (perhaps) predict change", and "(r)elationships among once static GIS elements may become clear once examined within a temporal framework" (*loc.cit.*). The accuracy of the information and predictions would depend on how often observations are made or data are collected. In practice a compromise should be reached between collecting data too often, which would prove expensive, both in collection and in storage, and not often enough, which would result in gaps in the changes over time (*loc.cit.*).

Although the inclusion of historical data in the design of LISs has been contemplated for many years, the concept of TGIS technology has only recently become possible due to increased computer processing and storage power, and the development of more powerful data base software. Temporal GIS is a dimension in the GIS field which is receiving more attention at the moment, but development of the technology is still in its infancy stages. In the development and refinement of this technology, much of the research conducted has been in the field of land use change (*loc.cit.*). Recently temporal urban

mapping is also being used to examine the changes in landscapes, census statistics and land use to develop patterns of urban development, and to provide useful insights into the future (Acevedo, *et al.*, 1996;148 - 150).

Considering the history of the GEA discussed above, and the lack of reliable information on the area, there are likely to be many gaps in the historical data collected. In the GEA the focus of such a TGIS would be on land-use change, mainly for the purpose of creating a trail of legal evidence so that the land rights could ultimately be adjudicated. The inclusion of this technology in the design of the land records system should be borne in mind when drawing up the specifications for the design of the system.

6.4.3 Services

I have shown that data relating to the services in the GEA should be recorded in the land records system (see Chapters Two and Five), or, as described above, contained in separate data bases linked to the land records system (Dale and McLaughlin: 1988: 76-78). There are two types of services data which have been discussed: firstly, the spatial and attribute data relating to the positions and details of the actual municipal services in the area; and secondly, the attribute data describing the status or level of the services available to each household.

The spatial data on the positions of the services would be determined from information in the PMTLC's records and from technical field inspections, and could include information relating to any informal extensions and connections to the municipal services networks (spatial and non-spatial) (see Chapters Two and Five). The attribute data relating to the actual services would include data such as the age, dimensions and condition of the various services as well as estimates of usage/capacities/flows and the amount of consumers served, determined from information in the PMTLC's records and from technical field inspections. It may also include an estimate of the position of each of the various elements of service on the continuum of formality-informality for services (see Chapter Three). The second type, the data on the level of the services available to each household, would be determined from a socio-economic questionnaire-survey to each household. These data could be organised in terms of the multipurpose cadastre tools of the layers and the unique parcel identifier, or through the integrated system and relational data base, they could be linked with remote data bases, as described above. Sometimes services

data are already available only on a separate data base, and sometimes they are paper-based, and not digital, in which case a link to the separate data base is the most appropriate.

The relational data base qualities of the multipurpose cadastre would be used to analyse the spatial relationships between the services data, including the data received from the questionnaire-survey, such as distributions, or queries relating to spatial attributes.

6.4.4 Cost-Recovery

The tools associated with a multipurpose cadastre could also support the information relating to cost recovery. This is information from questionnaire-surveys, such as the distribution of households, socio-economic data, and the distribution of formal/ informal housing and structures. This data is non-spatial, but has a spatial aspect as it relates to a parcel or structure and ultimately to the household this entity represents. This is administrative information and it is intended that such information be used to ascertain socio-economic levels and spatial distribution, and to determine affordability levels in order to plan the installation/extension/upgrading of municipal services.

After determining the spatial distribution of households and their socio-economic levels, the information should be used to establish street addresses of houses/structures and to plan the locations of cluster-postbox sites and payment points; the first two for receiving the municipal accounts for services consumed, and the latter for paying these accounts (see Chapter Five, and Appendix B).

The storage and processing of this data require the tools of the non-spatial part of the multipurpose cadastre database, with the unique parcel identifier being used to link the data to a particular parcel or house/structure. The relational database would be used to analyse and extract the spatial relationships from the data.

In conclusion, I have shown that land information systems, and the concept of the multipurpose cadastre, are very flexible and can be designed to adapt to the requirements of the situation. As mentioned by Fourie and van Gysen (1996: 358) when examining the multipurpose cadastre for its applicability to the Rehoboth registry in Namibia, there are generally additional features evident in the situations

encountered in developing countries which fall outside the definitions and distinguishing features of the typical multipurpose cadastre described in the literature. In considering above the requirements for a land records system to manage the upgrading of land tenure and services in the GEA, it has been shown that there is a need for non parcel-based data to be included, and for the dimension of time to be incorporated in the design of the system. It is also necessary to include a record of the municipal services so that the level of services for each household can be determined and recorded in the system, and data to facilitate cost recovery. I agree with Fourie and van Gysen (1996) that perhaps such additional classes of information and capabilities of the land records system for the GEA discussed above, should "be incorporated in new thinking about multipurpose cadastres" (*ibid.*: 358).

The incorporation of the concept of the multipurpose cadastre into the design of the land records system for the GEA, as well as the inclusion of non-parcel-based tenure systems and historical or temporal data, deals to a large extent with the requirements for the technical sub-system as defined above. It also deals, in a broad sense, with part of the requirements for the institutional sub-system, in that part of the user needs and cultural issues would have been incorporated into the design. However, the in-depth involvement of all the users would still need to be encouraged to determine in detail the users' needs and requirements, and any further cultural issues, for inclusion in the design of the institutional sub-system of the land records system for the GEA.

6.5 Conclusions

The term 'land records system' chosen to describe the system to be used to manage the upgrading of land tenure and services in the GEA is appropriate, because, as I have shown, such a system will be a combination of various types of systems.

I showed that any land information or land records system comprises two sub-systems, an institutional sub-system which is concerned with the people associated with the system, and a technical sub-system which relates to the hardware, software, database and procedures, standards and protocols associated with these. I showed, however, that the technical operations of a modern LIS are becoming increasingly routine and straight-forward, including the storage and retrieval of data, the manipulation of the data to

create queries, and the output of the information in the required format, and that it is the institutional issues surrounding the people which are still the major constraining factors, and which require a great deal of attention, especially in the design stage.

I showed that it is crucially important to the pace and success of the development of the land records system to involve, in decisions relating to the design of the system, all the people who are or will be users of the land records system, including those people who will work with the system, the people who will produce, access and maintain the data in the system on a regular basis, and the people in the development committees of the communities which will be part of the system, and so on. Care should be taken to identify all the users, and then to determine their needs, including any cultural issues, and these should be taken into account in every aspect of the design of the land records system.

In analysing the information requirements identified in the preceding chapters and this chapter, I have extracted the five main themes which should be incorporated in the design of the land records system for the GEA. Firstly, I have shown that the design of the land records system to manage the upgrading of informal settlements (land tenure and services) in the GEA should be based on the concept of the multipurpose cadastre, for its sound structure and its ability to deal efficiently with land rights associated with cadastral land parcels, for the purpose of land management. Secondly, however, I have shown that the land records system should go beyond the normal design and information profile of a multipurpose cadastre and also be able to record and deal with non-parcel-based tenure, not normally included in a multipurpose cadastre - in essence therefore, it should be designed and constructed as a dual system. This is so that, in addition to the data related to formal ownership and formal cadastral land parcels, the land records system will also be able to handle the adapted customary and communal/group land tenure rights which exist in informal settlements in the GEA, and provide for communal tenure as an option for a land tenure reform model as discussed above (see Chapter Two). The cultural values of the rules of the adapted urban form of the Zulu customary land tenure system should also be incorporated as accurately as possible so as to preserve the cultural aspects of the *de facto* tenure system in operation in the conventional informal settlements in the GEA.

I have shown that this dual system the details of each property for the parcel-based tenures would be linked to the cadastral parcel as usual in a multipurpose cadastre. However, an important additional

information requirement when dealing with non-parcel-based tenure is the house/structure number. This number should be unique, for example incorporating a co-ordinate value of the position of the house/structure, or with part of it indicating the cadastral property description of the underlying formal cadastral parcel. This number is critical to the system as it will be the only identification of the spatial location of an element of informal tenure, and will be the link between this tenure holding in the spatial land records system, and the non-spatial attribute data relating to that tenure holding, stored in the data base elsewhere in the system.

Thirdly, the land records system should be designed to incorporate the latest temporal GIS technology so that historical data can be stored and analysed to establish a trail of legal evidence to assist the adjudication of land rights process. Fourthly, the land records system should be accessible to the public in the GEA, both in terms of the location of a computer terminal where they can access the information, and the cost of acquiring data from the system. Finally, the land records system should be designed to incorporate all the users' needs and requirements, including any cultural issues, and to be extremely user-friendly, as most people who will use it will not have extensive computer skills. This user-friendliness should apply mainly to the interface with the user, but should also extend to the mode of storage of data, the structure of the query processes, and the output of the information in an appropriate format. As part of the user-friendliness, the design of the system should be such that the output from the land records system facilitates the visualisation of the situation on the ground, to aid users and decision-makers.

One of the technical aspects of the design of any land information system or geographic information system, but one which is particularly important for the design of the land records system for the management of informal settlements in the GEA, is the set of procedures and policies for the maintenance of the data in the data base. Data base maintenance policies and procedures should be established to identify and update in the system, any new or upgraded tenure or services in the GEA. These processes will clearly be different for the two parts of the dual system proposed, that is for the cadastral parcel-based tenures, and for the non-parcel-based tenures. Once again the community, as the people concerned, are the people who should be involved in the updating of the data to reflect any changes which may occur in the settlements in the GEA. I will discuss this further below (Chapter Seven).

Further examples of additional attribute data in respect of each parcel or each house/structure which the land records system should be able to accommodate to facilitate planning of services, are the level of services provided to each land parcel or house/structure, and demographic data relating to the occupants of each house/structure. Data relating to cost recovery have also been identified as important data to be included. I have shown that these data can be accommodated within the normal design of the multipurpose cadastre.

In the following, and final chapter I will review the information requirements identified in this dissertation, and show how the five themes discussed above, if incorporated into the design of the land records system for the GEA, will satisfy these information requirements and design criteria which have been identified, and will facilitate the implementation of the four processes involved in the upgrading of informal settlements in the GEA.

CHAPTER SEVEN

THE CONCEPTUAL DESIGN OF A LAND RECORDS SYSTEM FOR THE GREATER EDENDALE AREA

7.1 Introduction

Firstly, the threads of the background to the design of the land records system , as described above in this dissertation, will be drawn together. Secondly, the five main themes which were identified (see Chapter Six) as being crucial to the design of the land records system for the GEA will be reviewed and it will be shown that the information requirements and design criteria identified in relation to the upgrading (tenure and services) of the various informal settlements in the GEA (see Chapter Five), fit into the framework created by these five themes. Thirdly it will be shown how the four processes of upgrading informal settlements in the GEA, namely, land delivery, land tenure reform, provision of services, and cost recovery (see Chapter Two) rely on the tools associated with the five themes of the design of the land records system.

Fourthly, I will present a brief conceptual design of the land records system which is I have shown is necessary for the management of the upgrading (tenure and services) in the various informal settlements identified in the Greater Edendale Area. Finally, I will outline the PMTLC's land information system and the data available, and I will conclude by arguing that the PMTLC has the basic land information system and data to implement a land records system to manage the upgrading of land tenure and services for the GEA, but that it needs to be expanded in certain areas to accommodate the design criteria and information requirements identified in this dissertation. I will also identify the topics and challenges which have not been fully explored, but which need to be further investigated as they may have an effect on aspects relating to the information requirements or system design identified in this dissertation.

7.2 Background

The history of South Africa, and in particular the previous (colonial and apartheid) governments' policies have left their mark on the land tenure patterns and land administration systems which have developed in the Greater Edendale Area (see Chapters Four and Five above). These policies created an artificial shortage of land for Blacks and skewed the distribution of land in the country generally, as well as in the Pietermaritzburg-Edendale area. As a result, several forms of informal settlements have developed in the GEA, with varying levels and aspects of informality. The informal settlements in the GEA exist on a continuum of formality-informality (see Chapter Three), and virtually every tenure pattern in the Greater Edendale Area exhibits certain aspects of informality. That is, all settlements in the GEA exist at some point on the continuum of formality-informality.

The present government is committed to improving the situation in informal settlements, and has laid down various policies and gazetted various pieces of legislation in this regard (see Chapter Two). In terms of this range of policies and legislation relating to the upgrading process, I have concentrated in this dissertation on the land tenure reform and provision of services. I have argued that there are four processes which make up the process of upgrading (tenure and services) of informal settlements, and have identified these as, the land delivery process, the land tenure reform process, the provision of services process, and finally, the cost recovery process (see Chapter Two).

I have also shown throughout this dissertation that, in relation to the above issues, there are numerous and varied information requirements for the design of a land records system intended for the management of informal settlements in the Greater Edendale Area. I have shown further (see Chapter Six) that the land records system should be a form of a land information system, and should be based on the concept of a multipurpose cadastre, but with additional design requirements specifically for the management of the informal settlements in the Greater Edendale Area. These additional requirements, which go beyond the characteristics of a conventional multipurpose cadastre, should be built into the design of what I have termed a land records system, specifically for the informal settlements in the GEA. The two main classes of these additional requirements are: non-parcel-based tenure, together with the tenure rules of the adapted urban version of the Zulu customary land tenure system; and historical, or temporal, data.

These additional design criteria are required because there are large areas of the GEA where conventional informal settlements have developed with *de facto* tenure, mainly on State owned land (see Chapter Five). This *de facto* tenure has been influenced by the traditional rural Zulu customary land tenure system. There are other forms of informal settlements in existence in the GEA, notably backyard shack settlements on privately owned land in parts of Edendale Proper and Plessislaer, where the tenure system in place is an unrecorded version of the landlord-tenant relationship (see Chapter Five). Both these forms of informal settlement, which make up about 60% of the total housing in the GEA (see Chapter One), have non-parcel-based tenure, and exist on the informal side of the continuum of formality-informality discussed above (see Chapter Three). These settlements also need to be upgraded as required by government policies on land tenure reform and physical upgrading, as the land tenure is insecure, unrecorded, and informal and the services are insufficient or overloaded. The four processes of upgrading (see Chapter Two), would effect this, and the land records system should manage these upgrading processes. Regarding the inclusion of historical data, I have argued that, in order to manage the upgrading of the land tenure in these informal settlements, a trail of legal evidence for the informal settlements needs to be built up, to be used in the adjudication and ultimate awarding of land rights, and also to manage and monitor the upgrading process. The use of temporal GIS technology would enable this to be achieved.

This background above serves as context to the five major themes identified (see Chapter Six) for the design of a land records system for the GEA. These five themes are: firstly, that the land records system should be based on the concept of a multipurpose cadastre; secondly, the land records system should further be able to record and deal with non-parcel-based tenures which exist in the GEA; thirdly, the latest temporal GIS technology should be accommodated in the design; fourthly, the land records system should be accessible to the public and the communities in the various informal settlements in the GEA, in terms of both location and cost of accessing information from the system, especially for the poorer communities in the GEA; and finally, the land records system should be sensitive to the users, in that it should incorporate all the users' needs and requirements, especially any cultural issues, and should be extremely user-friendly in its interface with the users, and in its modes of data storage and output of information.

7.3 The Five Major Themes and the Design Requirements of the Land Records System for the GEA

The schedule at Appendix B lists a summary of the design criteria and information requirements identified as those appropriate for the design of the land records system proposed for the Greater Edendale Area, under the headings of the five major themes of the design of the land records system. I will review each of the five themes separately, as the headings appear in the schedule attached at Appendix B. I will show how these five themes and the tools associated with them, create a framework which encompasses the information requirements and design criteria summarised in the schedule.

7.3.1 The Multipurpose Cadastre

I have stated that the land records system design should be based on the concept of the multipurpose cadastre. As I have mentioned above (see Chapter Six), the multipurpose cadastre has received international acclaim as a form of land information system which is ideally suited to facilitate land management, especially relating to registered ownership of land, as it is capable of recording a wide range of information, and making it available to the users. As stated above (see Chapter Six), the multipurpose cadastre also typically contains or links to such information as land tenure, land value, land use, geological, geophysical and hydrological, services and planning controls, and supports such functions as land transfer, land taxation, town planning and general administration. Furthermore, other additional classes of information and capabilities have been recommended for incorporation into new thinking about multipurpose cadastres.

I am arguing, therefore, that the multipurpose cadastre is clearly ideally suited to recording parcel-based data, and furthermore its design makes it flexible to adapt also to other capabilities and types of data. I will show how the five tools associated with the multipurpose cadastre encompass the design criteria and information requirements identified for the upgrading of informal settlements in the GEA, as they relate not only to parcel-based tenures, but also to two other classes of data, services and cost recovery. To re-cap, these five tools of the multipurpose cadastre are, firstly, the geodetic reference framework and secondly, the multiple spatial layers for spatial data; thirdly, the attribute data bases for alpha-numeric non-spatial data; fourthly, the unique parcel identifier to link them; and finally, the integrated system design to combine all the above into one integrated system.

7.3.1.1 Parcel-Based Tenures

The parcel-based information should be accommodated within a normal multipurpose cadastre type design, which would be able to accommodate all the parcel-based tenure records and associated information (formal and informal) identified throughout this dissertation (see Chapter Four) (see Appendix B for a summary). The multipurpose cadastre makes it possible to record parcel-based spatial data, such as the cadastral boundaries, and the non-spatial data, such as the ownership details and other property-based data, each in their respective spatial and non-spatial data bases. The unique parcel identifier links them.

The various different classes of cadastral and ownership data (see Chapters Four and Five) should be stored separately - the spatial data on different layers, and the attribute data in different parts of the data base. These parcel-based tenure records in the GEA are firstly, the (spatial) formal cadastral parcel boundaries, as well as the (non-spatial) details such as the property description, dimensions and the registered ownership details associated with the parcel, either owned privately or by the State (see Chapters Four and Five).

In the privately owned parts of the GEA, I have mentioned that in respect of more than half of the properties, the registration is not current and informal owners therefore exist on these properties (see Chapter Four). The cadastral and ownership records of the initial ownership rights in terms of the DFA, and any parcel-based upgradable rights (if this method is adopted as one of the land tenure reform models - see Chapters Two and Four) are further examples of privately owned parcel-based tenure records in the GEA which are also part of the formal cadastral records, but at a different stage in their life-cycle. These informal owners, initial owners and owners of upgradable title should be accommodated in the ownership records, but with an indicator to show their status.

In the State owned parts of the GEA, in addition to the underlying formal cadastral parcels registered in freehold title in the name of the State, the overlapping parcel-based township records which are inferior titles issued by the ex-DDA (see Chapters Two and Four), should be included in the same parcel-based system, but the overlapping (DDA) cadastral parcels should be recorded on a different (spatial) layer to the freehold cadastral parcels. Similarly the freehold and inferior ownership details should be recorded in different parts of the attribute data base. Any further overlapping inferior rights, caused by

overlapping amending general plans, should also be recorded on in a different layer, and in a different part of the attribute data base. The attribute data base should record the type of inferior rights in existence and also the identification of the owner or rights holder. Finally, to inform the upgrading process, an attribute should be attached to each parcel held in terms of inferior DDA rights, which classifies it as either a Schedule 1 or Schedule 2 right in terms of the ULTRA Act (see Chapters Two and Four).

7.3.1.2 Services

I have shown that information regarding the services in the GEA should be recorded in the land records system (see Chapters Two and Five), or alternatively, the data base containing the services data should be linked to the land records system. There are two types of services data which have been discussed, firstly, the status (or level) of the services available to each household (non-spatial data), determined from a questionnaire-survey to each household; and secondly, the information from the PMTLC's records and from technical field inspections on the positions (spatial data), and the dimensions, construction and condition, *etc.*, of the municipal services in the area (attribute data). There is also information regarding estimates of usage/capacities/flows and the amount of consumers served (attribute data), and information regarding any informal extensions to, and connections into, the municipal services networks (spatial and non-spatial) (see Chapters Two and Five).

Assuming the services data is incorporated into the land records system data base, these data would be organised in terms of the tools of the multipurpose cadastre, namely the multiple spatial layers, the separate attribute data base, and the unique (parcel) identifier linking these two in the integrated system. In this case the unique identifier to link the spatial data and the attribute data would relate to a particular part of a specific service rather than to a cadastral parcel, as usual. The relational data base qualities and topological capabilities of the system would enable the analysis of the spatial relationships between the variety of data received from the questionnaire-survey, such as distributions, or queries relating to spatial attributes. On the other hand, sometimes services data are available only in a separate data base, and sometimes they are paper-based, and not digital. In any event, the system should still contain a link to these other data bases in the integrated system.

7.3.1.3 Cost-Recovery

There are several aspects associated with cost recovery, as described above (see Chapters Two and Five). Firstly, there is the information from questionnaire-surveys, such as the distribution of households, socio-economic data, and the distribution of formal/informal housing and structures. These data are non-spatial, but have a spatial aspect as they relate to a parcel or structure. Such data produce administrative information which can be used to ascertain socio-economic levels and spatial distribution, and to determine affordability levels in order to plan the installation/extension/upgrading of municipal services. Secondly, to facilitate cost recovery, the information could also be used, together with the spatial records of cadastral parcels, and mapping of households, roads and other access routes, *etc.* to establish street addresses and plan the locations of cluster-postbox sites and payment points. The first two assist the delivery of the municipal accounts for rates and services consumed, and the latter the paying of these accounts (see Chapter Five, and Appendix B).

The storage and processing of these data require the tools of the non-spatial part of the multipurpose cadastre database, with the unique parcel identifier being used to link the data to a particular parcel. The relational database would analyse and extract the spatial relationships from the data.

Therefore the first theme of the design of the land records system, being the solid base of the multipurpose cadastre, and the five tools associated with it, with minor adaptations where necessary, are ideally suited to the storage and processing of the data relating to the design criteria and information requirements in connection with parcel-based tenures, services and cost recovery measures in the various informal settlements in the GEA.

7.3.2 Non-Parcel-Based Tenures

Non-parcel-based tenures also need to be included in the land records system (see Chapters Two and Five). I have shown that this type of data is not normally included in a multipurpose cadastre (see Chapter Six). However, I will show that the flexibility of the multipurpose cadastre, together with the five tools associated with the multipurpose cadastre, with minor adaptations, can and should be used to accommodate, in the same land records system, the design criteria and information requirements relating

to the second theme of the design of the land records system, being non-parcel-based tenures. To re-cap, these five tools of the multipurpose cadastre are, firstly, the geodetic reference framework, and secondly, the multiple spatial layers for spatial data; thirdly, the attribute data bases for non-spatial data; fourthly, the unique parcel identifier to link them; and finally, the integrated system design to combine all the above into one integrated system.

Firstly, the non-parcel-based tenures should be depicted spatially with reference to the geodetic reference framework. I have argued that the informal settlement tenures should be contained within an outside figure, wherever possible (see Chapter Six). This outside figure containing a family, group of families or a community, would be a cadastral parcel, either an existing parcel or one created for the purpose, and would be recorded with the other cadastral parcels in the parcel-based part of the system. However, the evidence and spatial location of the individual informal tenures (and the individual houses/structures) within this community outside figure should be determined by some suitable method of mapping, either the actual limits of the individual informal tenures if these are visible on the ground, or represented by a co-ordinated point on or close to the house/structure as in the mid-point system (see Chapters Two, Five and Six). The geodetic reference framework would provide the reference framework for the locations of the non-parcel-based tenures, obtained from some suitable method of ground survey or mapping (see Chapter Five).

Secondly, the multiple spatial layers of the multipurpose cadastre are necessary to distinguish the non-parcel-based tenures from the parcel-based tenures, and even to differentiate between the different non-parcel-based tenures. The various non-parcel-based tenures should be accommodated on different layers as they each have varying levels of formality on the continuum of formality-informality (see Chapters Three and Five), and the upgrading processes for each are different. For example, the spatial extent of PTOs which are *de jure* rights (see Chapter Four) should be on a separate layer to that of, say, *de facto* rights in a conventional informal settlement on State owned land. In addition, in conventional informal settlements which are under the modernised adapted urban form of the Zulu customary land tenure system, specific additional data are required. In such settlements the limits of occupation of the community as a whole, and of the individual informal tenures, and any communal grazing rights, should be determined by some suitable method of mapping as described above, and recorded in the system. Because of the fluid nature of boundaries in Zulu customary tenure, the easy updating capabilities of the

separate layers of the multipurpose cadastre built into the design of the land records system will ensure that any changes in this type of non-parcel-based tenure are readily updated in the system.

Thirdly, the spatial/non-spatial capabilities of the multipurpose cadastre are important when dealing with the non-parcel-based tenures, so that attribute data relating to the non-parcel based tenures can be recorded in the system, and so that spatial queries can be done involving all tenure types. In the case of conventional informal settlements attribute data such as the property description of the outside figure, the name of the community, the contact details of the leadership of the community (see Chapter Five), and any details of the tenure rights or group titles relating to the community as a whole should be recorded. In addition, if a settlement is under the Zulu customary tenure system and there are any pyramiding over-rights or other cultural issueswhich will affect the powers of the leadership of the community, this attribute data should be recorded. In the case of non-parcel-based PTO's on State owned land any details of the PTO should be recorded, together with the status of the right as a *de jure* right, and any indication of the progress of upgrading of this right to full ownership. In the case of backyard shack settlements on privately owned land any details of the tenure relationship should be recorded, including the name and contact details of the landlord, if he/she is not the same person as the registered owner of the land.

Fourthly, an adaptation of the unique parcel identifier can accommodate a wide range of identifiers to relate to the house/structure (UNECA: 1998: 25-28) (see Chapters Two, Five and Six). The co-ordinated mid-point method described above, identifying and locating the non-parcel-based tenures, can be used as an adaptation of the unique parcel identifier for parcel-based tenures. This will facilitate a link between any details about the tenure right, such as the name of the holder of the right, the status of the tenure right, or the level of services in regard to the site under occupation, and the house/structure, which represents the location of the tenure right (see Chapters Two and Five).

Finally, the integrated system design is the fifth tool associated with the multipurpose cadastre, and this enables the easy adaptation of the multipurpose cadastre, normally used for parcel-based tenures, to accommodate non-parcel-based tenures successfully.

Therefore the multipurpose cadastre, together with its five tools and with minor adaptations where necessary, is capable of handling the storage and processing of the data to address the design criteria and information requirements relating to the second theme of the design of the land records system, that is the non-parcel-based tenures, for the land records system for the various informal settlements in the GEA.

7.3.3 Inclusion of Temporal GIS Technology

In order to address the third theme of the design of the land records system, that is the incorporation of historical data in the system (see Chapters Two, Three Four and Five), the design of the land records system should also incorporate the latest temporal GIS technology (see Chapter Six). The tools associated with this technology are the ability to record, analyse and output data in the form of trends or changes over time.

The most readily accessible historical data are the Surveyor General's cadastral records. However, for informal settlements and non-parcel-based tenures these data are often of little use. In these cases historical information could take the form of an old aerial photograph, or it could comprise such evidence as a house number given by ESKOM or some other service provider in the past, or a record of a lease agreement between a landlord and a tenant. The evidence would indicate the existence of sustained occupation of the tenure, and could be used in the adjudication process to create a trail of legal evidence, and to ultimately contribute to the awarding of land rights (see Chapters Two, Four and Five). The temporal facility could also be used, with respect to the processes discussed in the dissertation, to indicate trends and identify changes over time in the land, or to monitor development on the land and the upgrading of land tenure and/or services.

Hermosilla (1994: 122) reports that the data structures used to determine changes which happened during a certain time period are fundamentally the same as those used to determine certain spatial objects which exist within a radius from a given point. The latter is a common spatial query performed, so it follows that the multipurpose cadastre should easily be able to be adapted to deal with temporal queries. The design criteria and information requirements for the inclusion of historical data should therefore be readily accommodated by the third theme of the design of the land records system, being the

incorporation of temporal GIS technology into the basic design of the multipurpose cadastre for the land records system for the GEA.

Therefore the multipurpose cadastre, with the incorporation of temporal GIS technology, will be able to address the design criteria and information requirements relating to the third theme of the design of the land records system, that is the inclusion of historical data for creating the required trails of legal evidence for the adjudicatory process to determine and award land rights, in the design of the land records system for the various informal settlements in the GEA.

7.3.4 Accessibility to the Community, including User-Friendliness

The fourth and fifth themes of the design of the land records system, being accessibility to the public and user-friendliness, respectively, can be discussed together, as accessibility to the users, especially the communities in informal settlements in the GEA, and the user-friendliness of the interface and outputs, are intertwined, and depend on each other (UNECA: 1998). As mentioned above (see Chapter Six) accessibility and user-friendliness are crucial to the success of the system. Accessibility to the community includes, in addition to the physical location of information terminals at places close to the communities in the GEA, such aspects as the community representatives being involved in all stages of the development of the system, as well as the maintenance of the data, and designers of the system using the concept of visualisation to assist the community in understanding the information output. This is particularly important where cultural issues are involved (see Chapter Six). As large areas of the GEA are covered by conventional informal settlements on State owned land, in which a modernised urban version of the Zulu customary land tenure system operates, cultural issues have been shown to be part of the way of life for most of the people living in informal settlements in the GEA. Community involvement in the design, operation and updating of data in the land records system for the informal settlements in the GEA is therefore crucial (see Chapters Five and Six).

Accessibility relies on the technologies involving the transfer of digital information to remote computer workstations. As mentioned above (see Chapter Six), the technology required to transfer the information from a centrally located land records system to remote workstations at the local level, and *vice versa*, already exists and is advancing continually. The land records system should be made available at the local level, possibly at several of the payment points proposed for the GEA, which will be chosen in

accessible locations (see Chapter Five). I argue that this will have the advantage of drawing the people to the payment points to boost cost recovery, and will give the PMTLC an opportunity to demonstrate to the people living in the GEA that it is serious about providing services, including information, to the people.

Regarding the involvement of the local communities in the operation and updating of data in the system to keep it current, local community members should be trained in these aspects. As mentioned above (see Chapter Six), community members should be trained as land administrators, guided by professionals in the PMTLC, to, amongst other tasks, collect the necessary information to maintain the currency of the data (see Chapter Six). This arrangement needs to be explored further.

In the definition by Dale and McLaughlin (1988) above (see Chapter Six), the multipurpose cadastre is defined as being "a large-scale community-oriented land information system" which "provides a ready and efficient means of access to the data" (Dale and McLaughlin: 1988: 63) (see Chapter Six). Therefore, the basic community-based and user-friendly qualities are already inherent in the concept of the multipurpose cadastre. With a little care the design of the land records system for the GEA, being based on the concept of the multipurpose cadastre, will be able to address the design criteria and information requirements relating to the fourth and fifth themes of the design of the land records system, that is, accessibility to and involvement by the communities which the system is intended to serve, and user-friendliness of the interface, data storage and output methods.

7.3.5 Conclusions

I have shown that the design criteria and information requirements identified in relation to the land records system (summarised in Appendix B), for the management of the upgrading of tenure and services in the various informal settlements in the GEA, fit into the framework created by the five main themes of the design of the land records system. These five themes, being that the system should be based on the multipurpose cadastre, that it should also accommodate non-parcel-based tenures and historical data, and that it should be accessible to the community and user-friendly in its design and output, were identified as being crucial to the design of the same land records system. Therefore all five main themes encompass the design criteria and information requirements identified for the land records system for the GEA.

7.4 The Four Processes of Upgrading Informal Settlements in the GEA

The four processes of upgrading of informal settlements in the GEA were identified as the land delivery process, the land tenure reform process, the provision of services, and the cost recovery process (see Chapter Two). The focus of this dissertation has been to identify the design criteria and information requirements for a land records system to manage the upgrading of tenure and services in the various informal settlements in the GEA. These design criteria and information requirements have been identified throughout this dissertation and summarised in the schedule at Appendix B. I have shown above that the five main themes of the design of the land records system (see Chapter Six) encompass the design criteria and information requirements. I will show that each of the four processes of upgrading rely on the tools associated with the five main themes of the design of the land records system.

7.4.1 The land delivery process

The land delivery process is the first step in the upgrading process. Clearly land delivery should be done in a planned and sustainable manner. I am arguing that the land delivery process depends on the tools associated with the five main themes of the design of the land records system for the GEA. Certain information was identified above (see Chapter Two) as being necessary to inform the land delivery process. Digital topographic mapping showing the existing features such as roads, rivers, buildings and an indication of the slope of the land (for example, contours), is firstly necessary as the base mapping layer. In addition, data sets showing environmentally sensitive areas or areas worthy of conservation, and areas which are geologically or hydrologically unsound, are considered necessary in order to determine areas which are suitable for development, and which are not. In short, up-to-date planning data of the GEA, should reflect the areas which are suitable for development. In any event, planning information is also necessary to indicate any planning controls which may restrict any land delivery efforts. Furthermore, although land rights are dealt with more fully under the land tenure reform process below, it is also necessary to have a record of the existing land rights, both parcel-based and non-parcel-based, formal and informal, in order to give an indication of land which is available for development. State owned land which is not being put to optimal use should be targeted as first priority land for development.

It was stated above (see Chapter Two) that these data sets listed should be represented on separate layers in the land records system, and that the system should be flexible and easily updated to reflect changes in any data sets referred to above which are required for the land delivery process. It will be recognised that the data sets referred to above have all been identified as data sets which could and should be included in, or linked to, the basic multipurpose cadastre design of the land records system. Furthermore, it will be recognised that the qualities required of the system are inherent qualities in the design of a multipurpose cadastre (see Chapter Six). The land delivery process also requires historical data in order to establish the trails of legal evidence for the adjudication of land rights. Finally, the land delivery process also relies on the co-operation with the communities involved, therefore it is crucial that the land records system to inform the land delivery process is both accessible to the communities, and user-friendly in its interface, data storage and output modes. Therefore the land delivery process depends on the data sets contained within and linked to the land records system, and the inherent design capabilities of the system.

7.4.2 The land tenure reform process

As discussed above (see Chapter Two) the land tenure reform process is concerned with both the upgrading of existing land rights, and the development of innovative land tenure reform solutions for new land rights which are appropriate, affordable and sustainable. Options of communal-based tenures and upgradable individual tenures were suggested for land tenure reform. Whatever the situation, information regarding the existing land rights on the land must be available, both parcel-based and non-parcel-based, and formal and informal. Of particular importance, is knowledge of any overlapping land rights, as these must be dealt with and resolved in the process. In addition, any unrecorded land rights such as "current owners" referred to in the White Paper on South African Land Policy (1997) (see Chapter Two), and other informal tenant arrangements must also be dealt with. The classification of inferior rights as either Schedule 1 or Schedule 2 rights in terms of the ULTRA Act is also important information for the land tenure reform process.

Once again, it was stated above (see Chapter Two) that these data sets listed should be represented on separate layers in the land records system, and that the system should be flexible and easily updated to reflect changes in any data sets referred to above which are required for the land tenure reform process. It will be recognised that the data sets referred to above have all already been identified as design criteria

and information requirements for the design of the land records system. Many are basic design features of the multipurpose cadastre which forms the basis of the land records system, while others were identified to be incorporated into, or linked to the basic design of the land records system.

In addition, historical data and temporal GIS capabilities are necessary for the adjudication of land rights, and accessibility to the communities and the user-friendliness of the system are of paramount importance when land reform projects are being planned and implemented. Therefore, the second of the upgrading processes, the land tenure reform process, also relies on the five themes of the design of the land records system for the GEA, and the tools associated with it.

7.4.3 The process of the provision of services

As mentioned above (see Chapter Two), in terms of government policy, the local government structures (in this case the PMTLC) have certain social responsibilities, in particular the provision of services and the improvement of living standards for all, in a sustainable manner. In order to plan the installation or upgrading of services in an area, the PMTLC requires a record of the existing services in the area, that is the positions and the attribute data associated with the services, and also the data of parcel-based and non-parcel-based land rights in the area. In addition, the data from a socio-economic survey of each household, including the level/status of services available to each household, a demographic breakdown of the occupants of each household, and an income profile of the household as a whole, would enable the PMTLC to determine the appropriate and affordable levels of services for an area, and to ensure that the services installed/upgraded are appropriate and sustainable. Before any detailed planning and design of services are done, the PMTLC also needs accurate data regarding the positions and attribute data such as dimensions, capacities, *etc.*, of existing service mains, and the positions of any land rights or surveyed layouts.

Once again, there is the need for the land records system to show the various spatial data sets on separate layers, and for the system to be flexible and easily updated to reflect changes in any service data sets referred to above, which are required for the process involving the provision of services (see Chapter Two). It will be recognised that the data sets referred to above have all already been identified as design criteria and information requirements for the design of the land records system. Some, such as the land rights and surveyed layouts, are basic design features of the multipurpose cadastre which forms the basis

of the land records system, while others were identified to be incorporated into, or linked to the basic design of the land records system. In addition, in order to monitor the upgrading of services, the historical data of services and temporal GIS capabilities of the land records system are necessary.

Finally, to ensure that the installation of services is successful and sustainable, the support of the communities is necessary during the planning and construction phases. This will be facilitated by the involvement of the community in the collection of services data, and the accessibility to the land records system.

7.4.4 The cost recovery process

The final process, that is cost recovery for the above three processes but mainly for the provision of services, includes the requirement for sustainability as discussed above (see Chapter Two). Hence the efforts in each of the processes above to ensure that the information relating to the existing situation is available and is taken into account, as well as to carefully plan the land delivery, land tenure reform or provision of services. The appropriate and affordable levels of services, and the appropriate and acceptable land delivery and land tenure reform solution are important for sustainability. Finally, community involvement in the process is also essential to ensure the sustainability of the respective process.

Many of the data sets mentioned have already been identified as necessary to facilitate the cost recovery process. The spatial data sets indicating the distribution of households, that is the cadastral records and the non-parcel-based mapping base layer, and the socio-economic survey data can be used to establish a street address for each household, and can also be used to identify the most suitable location of cluster postbox sites, both of which are to facilitate the distribution of accounts to consumers and land owners for the rates and service charges. These same spatial data sets can also be used to choose the most suitable locations of payment points for the payment of these accounts by the consumers and land owners. These information requirements have already been identified as necessary, and included in the design criteria and information requirements for the land records system for the upgrading of the various informal settlements in the GEA.

In conclusion, therefore, I have shown that each of the four processes of upgrading of tenure and services in the various informal settlements in the GEA rely on several or all of the five main themes of the design of the land records system for the same area. That is, without the land records system which is being proposed, the necessary information for the upgrading processes would not be available.

7.5 Conceptual Design of the Land Records System for the GEA

Taking into consideration all the requirements identified throughout Chapters Two to Six of this dissertation, and the summary of these requirements in Appendix B, the design criteria and information requirements for the land records system for the GEA should be clear. However, for completeness they are recalled and grouped together below.

Firstly, the land records system should be based on the multipurpose cadastre, which makes it a community-based system which is flexible and user-friendly. The multipurpose cadastre base also means that it has the land parcel as the basic organisational unit, a relational data base structure and proven land management capabilities. However, the land records system should go beyond the usual design criteria and information requirements of the multipurpose cadastre, and incorporate the additional information and capabilities identified above (see Chapter Six).

The spatial data base of the multipurpose cadastre design should record the spatial location, that is the positions relative to the geodetic reference framework, of all land rights (both parcel-based and non-parcel-based, both formal and informal, and both registered and not registered) including the outside figure in a communal tenure arrangement, suitable digital mapping (topographic or aerial), and municipal services (wherever available). The spatial data should be stored in the multiple separate layers of the multipurpose cadastre, with like features on the same layer. Related to each spatial feature, or element of a spatial feature should be an array of attribute data, normally in the form of alpha-numeric files, stored in the textual attribute data base/s, such as property descriptions, details of ownership/tenure, land value, *etc.* of properties, or details of dimensions, condition, *etc.*, of services. Wherever there is spatial data with associated attribute data, there should be a unique link linking the spatial and attribute data in the two or more data bases. The system may also link to other, possibly remote, and possibly non-

digital, data bases, for example, textual ownership records, land values, or paper-based engineering design drawings of services.

The system should also include the capability to store and analyse historical data. The data storage entails data sets which may be spatial and/or attribute data, and are often similar to the current data, and but relate to historical events, and should contain a date. The historical attribute data may include scanned images in addition to textual data. This data is required to establish trails of legal evidence for the adjudication process of land rights. To analyse this data temporal GIS technology software is required to be incorporated in the land records system.

Finally however, as I have shown above (see Chapter Six), the people component of the land records system is the most crucial, and the success, sustainability and the pace of development of the system, could depend on the success achieved in developing the people component of the system. The land records system should therefore be accessible and user-friendly to the communities it is intended to serve. The communities should be consulted and involved in the decision making relating to the design, development and operation of the land records system for the various informal settlements in the GEA, particularly where cultural issues are involved. Representatives from the communities should be identified and trained as local level land administrators for the operation of the system at the local level, and for the capture and updating of the data relating to the communities. The design and interface of the land records system with the users should be sensitive to the users' needs, especially any cultural issues, and should be extremely user-friendly, even to the uneducated or illiterate user. It should also incorporate a feedback mechanism whereby the communities can continue to have input into the design, operation and updating of data in the system as they become more familiar with the technology and what the land records system can do. The output from the system should be accessible to the communities in both location and in cost, especially considering that most of the users in the area are poor.

7.6 Conclusions

The land records system has been described above in terms of a broad framework with a range of characteristics and capabilities or tools. All of these are necessary to be able to upgrade (tenure and

services) in the GEA to the point which would satisfy the land reform and physical services upgrading requirements spelt out in government policy. That is, it would not be possible to undertake land delivery, land tenure reform, provision of services and cost recovery, without the detailed land information identified (see Chapters Two to Five, and Appendix B). The only way to supply such land information would be to create such a land records system in the PMTLC. The PMTLC has the potential to establish such a land records system at the local level for the GEA.

Regarding the technology, the PMTLC's land information system is based on the concept of the multipurpose cadastre, however technology has advanced somewhat since commencing this dissertation, and technology now enables the spatial data, attribute data and linked digital images all to be stored in the same data base. The PMTLC's LIS runs on the latest GeoMedia software by Intergraph, which incorporates relational database structures to create topological relationships between spatial elements in the spatial data sets, and to process spatial relationship queries very efficiently. It is also extremely user-friendly.

The PMTLC has a local area network (LAN) within two neighbouring buildings occupied by the Departments of the City Engineer, City Planner, City Estates Manager and City Treasurer, for the efficient transfer of LIS/GIS data to the main internal users of the LIS. There is also a wide area network (WAN) in place to serve certain remote offices via a dedicated telephone link. This works adequately for the efficient transfer of textual files. Due to the use of WebMap, which incorporates internet solution technology for the transfer of small amounts of LIS/GIS data, remote users are also already able to obtain and view small amounts of LIS data using the user's internet browser. Due to the continual advances in technology in the field of data transfer, it should be feasible to transfer large amounts of LIS data from a land records system based on the central LIS servers housed at the PMTLC's head office, to remote users in the near future.

Regarding the data, the PMTLC's land information system already contains all the cadastral parcels for the GEA, and most of the ownership records, including the DDA inferior titles, and these are arranged in separate layers. There is also a separate linked data base which records the land and building value details as well as tenure and ownership data, and another which tracks the progress of housing

development projects, historical cadastral information relating to overlapping inferior land rights, details of these inferior titles and progress of the upgrading of these to full ownership.

There is also information relating to the positions of services in the GEA, as well as the *Masakhane* questionnaire-survey textual data which gives information on the status of the housing structures, the various services, socio-economic data, *etc.*, all related to each household. Each structure has been identified and given a unique number (which relates to the unique questionnaire number and the underlying property description). However, at present, only a record of the results of the questionnaire is recorded and linked to this structure - no analysis of the socio-economic or other data has been done for the area.

The accessibility of the LIS to the people in the GEA is not yet what it should be. At present the LIS is accessible to the public only at the central municipal offices in Pietermaritzburg. Possible additional venues for information dissemination points in the GEA have been discussed, but no decision has been made, and no steps have been taken to acquire and install computer workstations in these or other venues for this purpose. As mentioned above, expected developments in data transfer technology should facilitate the establishment of remote information dissemination points at selected venues in the GEA in the near future. However, the community representatives should be involved in the decisions of where the information dissemination points should be, and the manning of these stations, and this aspect also requires attention, as mentioned below.

Regarding the user-friendliness of the system, as already mentioned, the GeoMedia GIS technology is available and the software is extremely user-friendly. However, it is acknowledged that this user-friendliness is judged on western cultures and from a technical background. The user-friendliness for the communities in the GEA would have to be re-evaluated from the appropriate viewpoint. With respect to user-friendly output of information, digital orthophoto mapping of the GEA (from July 1997 photography) exists which will be output as a base layer, over which any other features stored in the system can be overlaid. The orthophoto base mapping represents a very user-friendly mode of output, which is more easily comprehended by the local population, and relates to the concept of visualisation which was recommended by UNECA (1998) (see Chapter Six).

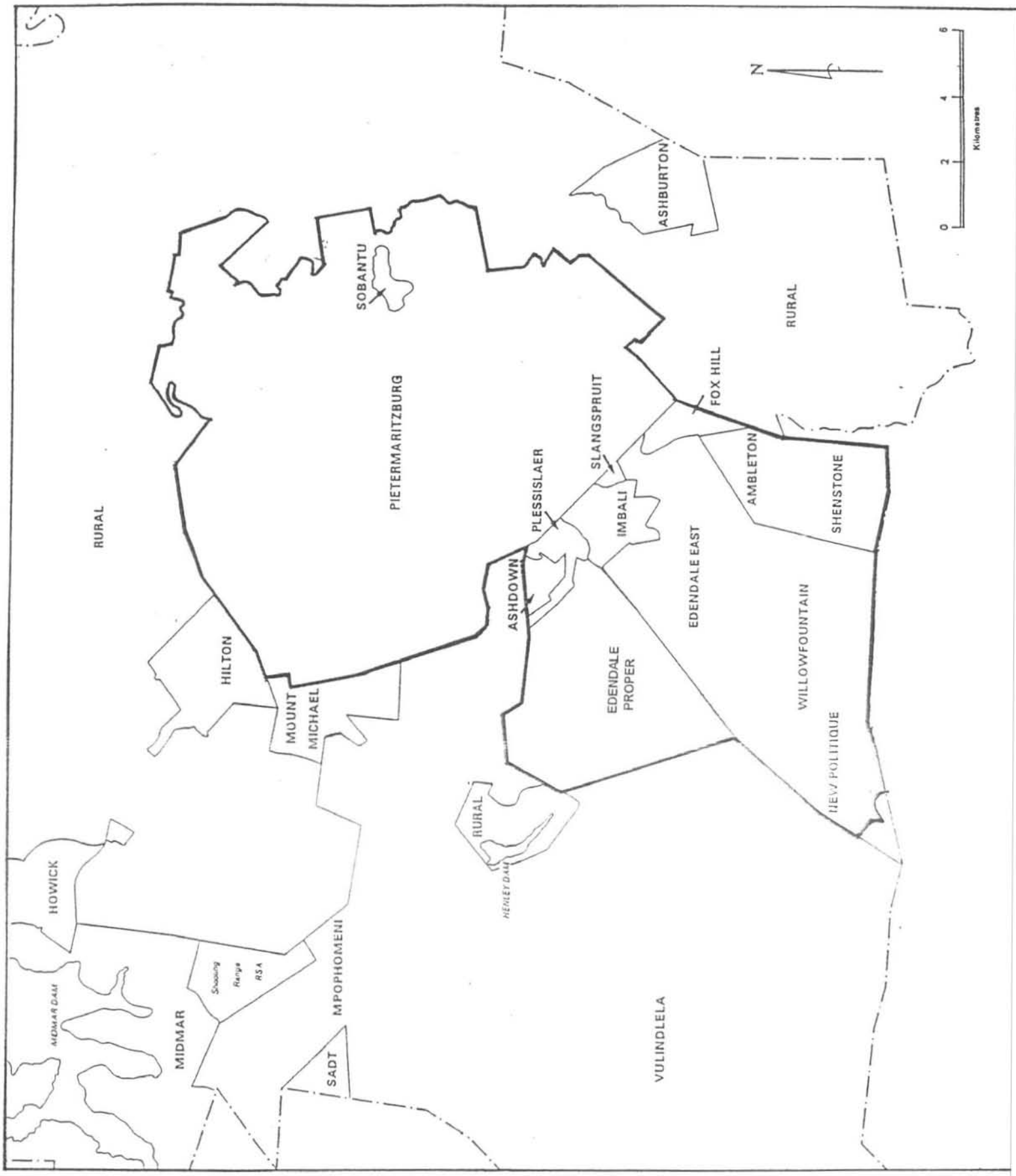
Therefore, with minor additions and amendments to the existing infrastructure and the land information system, the PMTLC should be able to implement a land records system along the lines described in this dissertation. The additions and amendments referred to are: firstly, both spatial and attribute data of non-parcel-based informal tenures need to be captured; secondly, the informal owners and "current owners" (long-term tenants) on privately owned land need to be identified and recorded in the system; thirdly, all relevant historical data relating to cadastral parcels, recorded and unrecorded tenure rights and occupation of land over extended periods, and services need to be captured, and appropriate and compatible temporal GIS software needs to be identified, acquired and installed into the system; fourthly, the users must be identified (for example the development committees in each community area) and consulted regarding their needs and requirements (including what they regard as user-friendly) for the system, and a feedback mechanism should be established whereby the users can continue to have input into the design, operation and maintenance of the system, as they become more familiar with the technology, and the land records system, and what it can do; fifthly, selected community members need to be trained to be local level land administrators for the operation and maintenance of the land records system and its various data sets; sixthly, the *Masakhane* questionnaire data should be analysed to determine socio-economic and affordability profiles of different parts of the GEA, as well as the existing status/levels of services, and the expected usage/capacities required of the services to cope with the expected future demands; and finally, the accessibility of the land records system to the communities it is intended to serve, needs to be re-evaluated and discussed with the communities, and strategies need to be put into place to implement these plans as soon as possible.

These additions/amendments to the PMTLC's LIS described above will enable the PMTLC to manage the upgrading of tenure and services in the various informal settlements found in the GEA, and in particular, to determine the rightful owners on privately owned and State owned land and to follow the legal process to have this information recorded in the formal/legal records. They would also enable the PMTLC to plan and design the services infrastructure, and to put a programme in place, together with the community representatives, for the installation of these services. These would facilitate the upgrading of tenure and services in the various informal settlements in the Greater Edendale Area, and enable the Pietermaritzburg-Msunduzi Transitional Local Council to comply with the government's policies in this regard.

In conclusion, it has not been possible to cover rigorously every aspect of the development of the land records system, the legislation and the technology because of time constraints. There should be further study done of these areas. For example, legislation not dealt with in this dissertation, but which could have an effect on the existence of additional rights in land in the GEA, needs to be considered. In particular, two pieces of legislation, the Interim Protection of Informal Land Rights Act (No, 31 of 1996) and the Prevention of Illegal Eviction From and Unlawful Occupation of Land Act (No. 19 of 1998), were mentioned but not dealt with. Another subject which was touched on but requires further investigation due to its complexity, is the community involvement and determination of users' needs. Finally, temporal GIS requires further investigation by the people designing the data base, in order to take advantage of the latest developments in this technology.

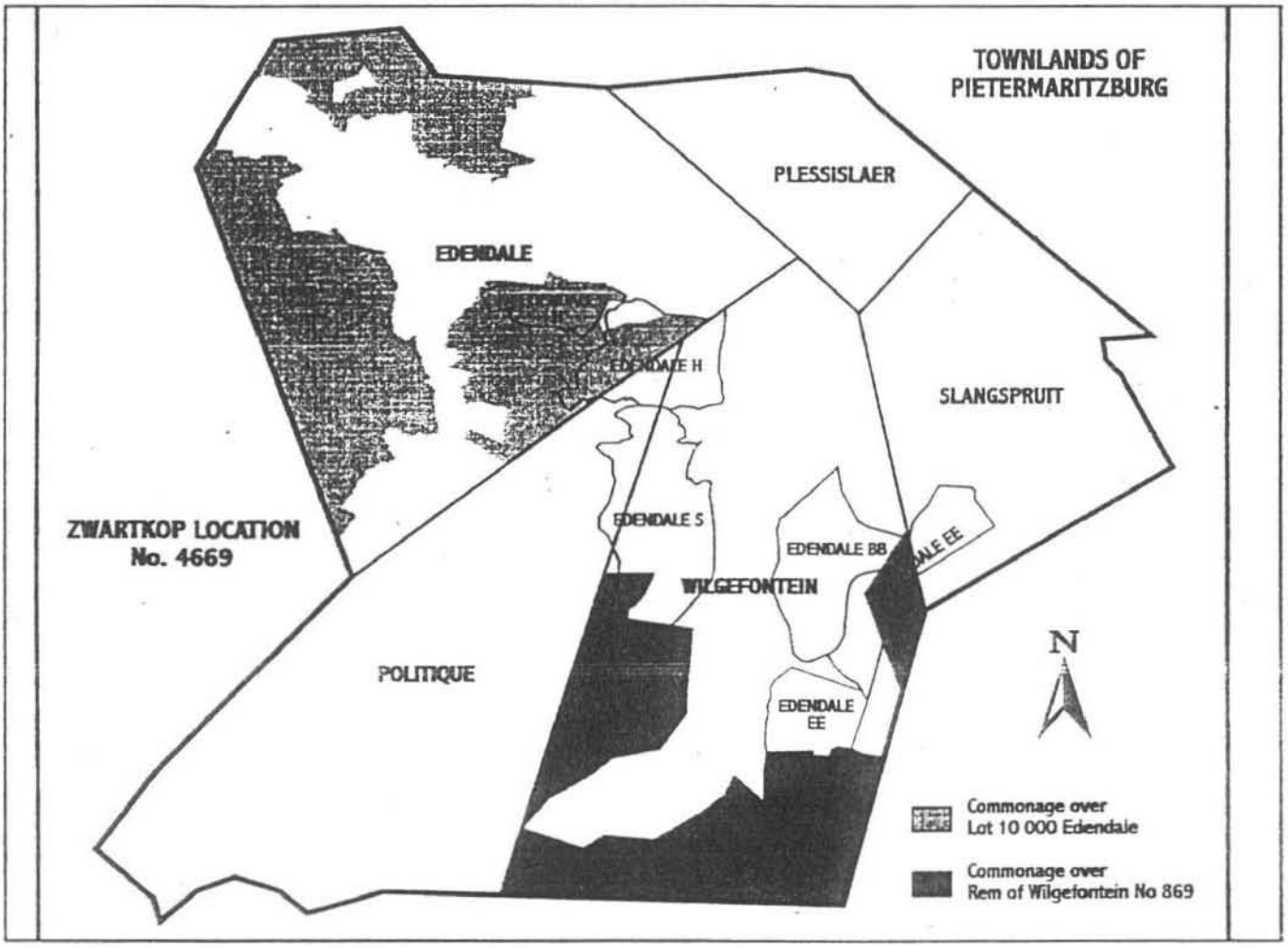
APPENDIX A

MAPS AND PLANS



Key: PMTLC's boundary shown in a heavy border

MAP #1: THE PIETERMARITZBURG-MSUNDUZI TRANSITIONAL LOCAL COUNCIL AREA AND SURROUNDS



(from Natal Witness: 1998b: 12)

MAP #2: COMMONAGE AREAS IN THE GREATER EDENDALE AREA

MAP #3: REGULAR FORMAL DEVELOPMENT IN EDENDALE UNIT J.

A Road names

Roads

Buildings

Cadastral

Scale 1:2 500

0 15 30 45 60 75 m

MAP #4: BACKYARD SHACKS ON SMALLER PROPERTIES AND (BACKYARD) SHACK-FARMING ON THE LARGER ONES IN THE DAMBUZA/MACHABISA AREA.

ROADS

Buildings

RegisteredCadastral

SCALE 1:7 000

0 60 120 180 240 300 m

MAP #5: CONVENTIONAL INFORMAL SETTLEMENT ON STATE OWNED LAND BETWEEN PROCLAIMED DDA TOWNSHIPS OF EDENDALE EAST.

ROADS

BUILDINGS

Cadastral

SCALE 1: 5 400

0 30 60 90 120 150 m

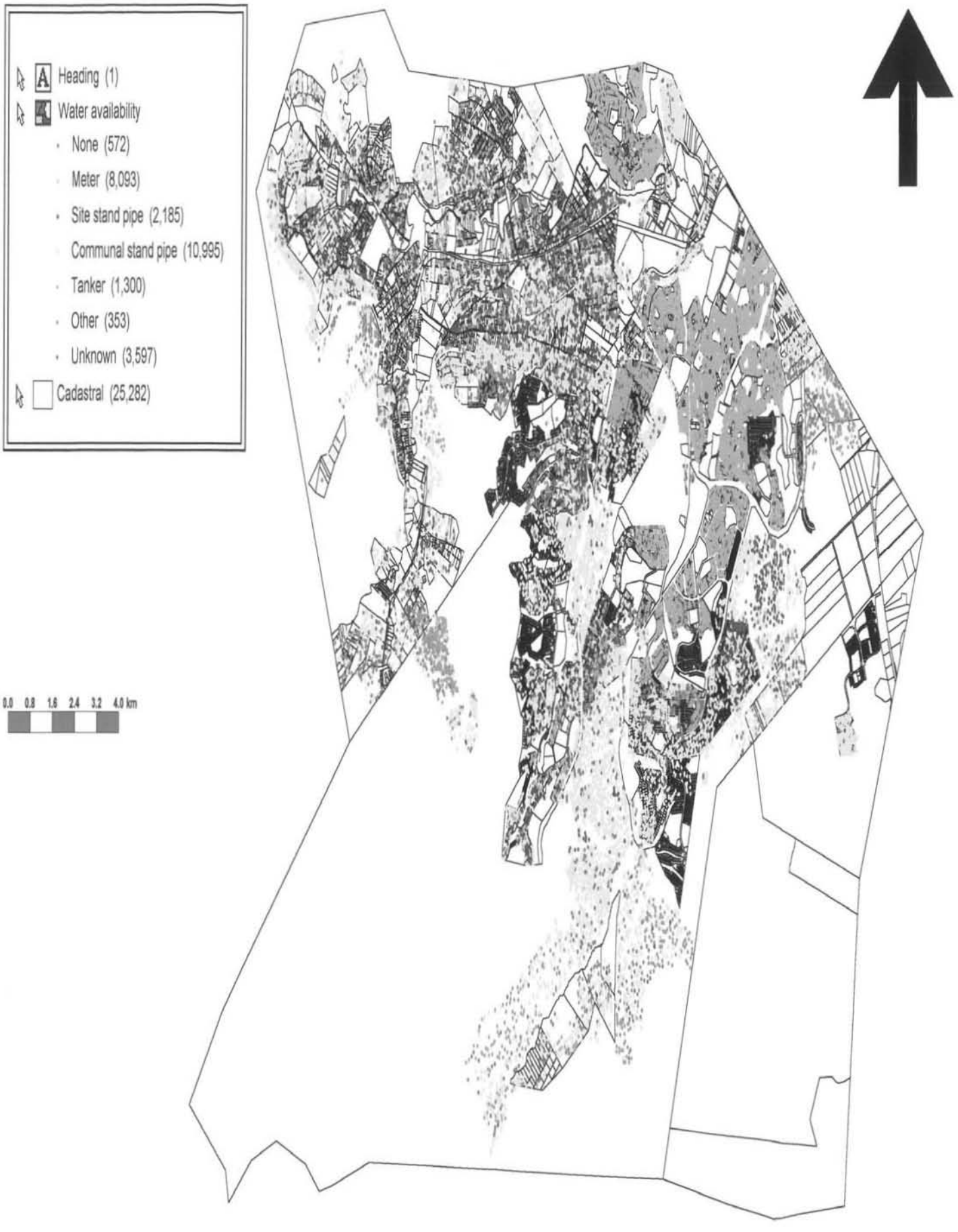
MAP #6: CONVENTIONAL INFORMAL SETTLEMENTS OVER SURVEYED BOUNDARIES OF UNDEVELOPED DDA TOWNSHIP (UNIT BB).

Buildings

RegisteredCadastral

SCALE 1:2 000

0 15 30 45 60 75 m



MAP #7: MAP SHOWING THE DISTRIBUTION OF VARIOUS LEVELS OF WATER SERVICES IN THE GREATER EDENDALE AREA.

MAP #8: MAP SHOWING THE DISTRIBUTION OF VARIOUS LEVELS OF SEWAGE DISPOSAL SYSTEMS IN THE GREATER EDENDALE AREA.

MAP #9: MAP SHOWING FORMAL AND INFORMAL STRUCTURES IN THE GREATER EDENDALE AREA.

APPENDIX B

SCHEDULE OF DESIGN CRITERIA FOR THE LAND RECORDS SYSTEM FOR THE GREATER EDENDALE AREA

SCHEDULE OF DESIGN CRITERIA FOR THE LAND RECORDS SYSTEM FOR THE GREATER EDENDALE AREA

DESIGN CRITERIA	INFORMATION TYPE	G, A, or S	CHAPTER
THEME 1: LAND RECORDS SYSTEM DESIGN TO BE BASED ON DESIGN OF MULTIPURPOSE CADASTRE			
(a) DESIGN OF SYSTEM	Design should be based on the design of the multipurpose cadastre (sound design, community-oriented, parcel-based) but must go beyond it (include non-parcel-based records and historical or temporal data - see Themes 2 and 3 below)	S	6.
1. RELATIONAL SPATIAL DATA BASE	Data base should be a relational spatial data base with full topological linkages so that spatial relationship queries can be processed.	S	2, 5, 6.
2. INTEGRATED SYSTEM OF LINKED DATA BASES	System should have set procedures, standards and protocols to control information moving into, out of, and around in the system Main data base to link with other separate data bases and storage of paper drawings, etc.	S S, G, A	6. 2, 6.
3. FLEXIBLE AND EASILY UPDATED	Land records system information should be maintained current, and updated as and when changes occur - data base maintenance procedures to monitor changes, including links to Surveyor General and Registrar of Deeds for changes in cadastral and registration data.	S, G, A	2, 3, 4, 5, 6.
(b) PARCEL-BASED TENURE	Parcel Number is unique link to attribute data.	G, A	2, 4, 5, 6.
1. FORMAL CADASTRAL DATA	• Freehold cadastral boundaries and information • Names and details of registered owners • Names and details of informal (not registered) owners • Identification of initial ownership in terms of DFA • Names and details of Initial Owners in terms of DFA	G, A A A A A	2, 4, 5. 2, 4, 5. 2, 4. 2, 4. 2, 4.

KEY [Type of Requirement]: **G = Graphical (spatial) data** **A = Attribute (non-spatial) data** **S = System requirements**

SCHEDULE OF DESIGN CRITERIA FOR THE LAND RECORDS SYSTEM FOR THE GREATER EDENDALE AREA

DESIGN CRITERIA	INFORMATION TYPE	G, A, or S	CHAPTER
Theme 1: Land Records System Design to Be Based on Design of Multipurpose Cadastre (Continued)			
(b) Parcel-based Tenure (Continued)			
2. DDA CADASTRAL DATA	• DDA cadastral boundaries and information	G, A	2, 4.
	• Identification of type of inferior right (Deed of Grant, 99-Year Leasehold or parcel-based PTO)	A	2, 4
	• Identification of overlapping inferior rights	G, A	2, 4.
	• Names and details of registered (DDA) owners, including of overlapping rights	A	2, 4.
	• Classification of rights in terms of ULTRA Act (Schedule 1 or Schedule 2)	A	2, 4.
3. LAND TENURE REFORM MODELS	• Identification of upgradable individually based land rights	A	2.
	• Names and details of owners of upgradable tenure	A	2.
	• Outside figure parcel around communal/group titles	G, A	2.
(c) SERVICES			
1. STATUS OF SERVICES	• From questionnaire-survey of every household get pattern of status of service provision throughout the GEA	A	2, 5.
	• Record the levels of formality on continuum of formality-informality of housing and services	A	3, 5.
2. MUNICIPAL SERVICES	• Positions of municipal services from as-built drawings or field inspections	G, A	2, 5.
	• Condition of municipal services from inspection reports	A	2, 5.
	• Record informal extensions and informal connections to municipal services	A	5.
	• Estimates of use of services, e.g. number of consumers served, estimated usage/flows/capacities required.	A	5.

KEY [Type of Requirement]: G = Graphical (spatial) data A = Attribute (non-spatial) data S = System requirements

DESIGN CRITERIA	INFORMATION TYPE	G, A, or S	CHAPTER
Theme 1: Land Records System Design to Be Based on Design of Multipurpose Cadastre (Continued)			
(d) COST RECOVERY			
1. SOCIO - ECONOMIC DATA	• From the questionnaire-survey determine the socio-economic levels and distribution of the households • Use questionnaire-survey to determine formal/informal structures in the GEA • Use socio-economic data and information regarding formality of housing to determine affordability levels of households and communities • Use affordability levels of households and communities to plan upgrade and installation of services in a sustainable manner	A A A G, A	2, 5. 2, 5. 2. 2.
2. CLUSTER-POSTBOX SITES	• Use distribution of households from data on housing to plan locations of cluster-postbox sites for postal service	G, A	2.
3. PAYMENT POINTS	• Use distribution of households from data on housing to plan locations of payment points for paying accounts for municipal services consumed	G, A	2.
THEME 2: INCLUDE NON-PARCEL-BASED TENURES			
(a) DESIGN OF SYSTEM			
1. DUAL LAND TENURE SYSTEM	Following on from Theme 1 above, all land tenure (both parcel-based and non-parcel-based) should be accommodated in a dual system. The non-parcel-based tenures should be contained within an outside figure which is a land parcel surveyed and registered in the parcel-based freehold system.	S, G, A	2, 4, 5, 6.

SCHEDULE OF DESIGN CRITERIA FOR THE LAND RECORDS SYSTEM FOR THE GREATER EDENDALE AREA

DESIGN CRITERIA	INFORMATION TYPE	G, A, or S	CHAPTER
Theme 2: Include Non-parcel-based Tenures (Continued)			
(b) NON-PARCEL-BASED TENURE	Unique house/structure number given to each household is link to attribute data.	G, A	2, 5, 6.
1. *DE FACTO* TENURE ON STATE OWNED LAND	• Topographical mapping of *de facto* tenure in conventional informal settlements	G	2, 5.
	• Names and details of community leadership and individual tenure holders	A	2, 5.
	• Tenure system rules in place	G, A	2, 5, 6.
2. *DE JURE* TENURE ON STATE OWNED LAND	• Topographical mapping of *de facto* (non-parcel-based) tenure	G	4, 5.
	• Record of PTO which gives the *de jure* right	A	4, 5.
	• Name and details of PTO holder	A	4, 5.
	• Classification of rights in terms of ULTRA Act (Schedule 2)	A	4, 5.
3. BACKYARD SHACK SETTLEMENTS	• Topographical mapping of backyard shacks and (backyard) shack-farming	G	2, 5.
	• Identification of informal landlord-tenant arrangement	A	2, 5.
	• Identification of underlying freehold property and owner (landlord)	A	2, 5.
	• Names and details of tenure holders (tenants)	A	2, 5.
4. LAND TENURE REFORM MODELS	• Topographical mapping of Starter Titles in upgradable tenure reform model	G	2.
	• Record of mid-point coordinates identifying tenures recorded by this method	A	2.
	• Group tenure in outside figure (eg. Communal Property Associations Act)	G, A	2.
	• Names and details of holders of upgradable land rights	A	2.
5. THE ADAPTED URBAN FORM OF ZULU CUSTOMARY LAND TENURE SYSTEM	• Topographical mapping of limits of community boundaries	G, A	2, 5.
	• Name and details of Community Leadership	A	2, 5.
	• Existence of any Pyramiding over rights	A	2, 5.
	• Topographical mapping of limits of communal land (for grazing or other)	G, A	2, 5.
	• The principle of Fluidity of Boundaries	G, A	2, 5.

KEY [Type of Requirement]: **G = Graphical (spatial) data** **A = Attribute (non-spatial) data** **S = System requirements**

SCHEDULE OF DESIGN CRITERIA FOR THE LAND RECORDS SYSTEM FOR THE GREATER EDENDALE AREA

DESIGN CRITERIA	INFORMATION TYPE	G, A, or S	CHAPTER
THEME 3: INCLUSION OF TEMPORAL GIS TECHNOLOGY			
(a) DESIGN OF SYSTEM	To accommodate historical data for the trail of legal evidence for (i) adjudication of land rights, (ii) record of upgrading processes, (iii) changes in level of formality-informality.	S, G, A	2, 3, 4, 5, 6.
(b) HISTORICAL DATA			
1. PARCEL-BASED TENURE	• Trail of legal evidence of sustained occupation of land/structure • Historical information of cadastral data, DDA cadastral data, and the land tenure reform process should be retained to show changes over time	G, A G, A	2, 4. 4.
2. SERVICES	• Historical record of status of services, as well as positions, condition, and usage/loads/consumption/capacity figures • Levels of formality on the continuum of formality-informality over time.	G, A A	2, 5. 2, 5.
3. NON-PARCEL-BASED TENURE	• Trail of legal evidence of sustained occupation of land/structure under *de facto* or *de jure* tenure, landlord-tenant tenure, and any upgrading/land tenure reform tenure • The principle of Fluidity of Boundaries means that boundaries change over time, both in respect of the whole community and of internal individual members. • Levels of formality on the continuum of formality-informality over time	G, A G, A A	2, 3, 4, 5. 2, 5. 2, 3, 5.
4. COST - RECOVERY	• Historical records of socio-economic data to determine trends for planning • Historical data on formal housing/informal structures for trends for planning • Historical data on payment records to determine distribution and percentages of areas of most successful cost-recovery	A A A	2, 5. 2, 5. 2, 5.

KEY [Type of Requirement]: G = Graphical (spatial) data A = Attribute (non-spatial) data S = System requirements

SCHEDULE OF DESIGN CRITERIA FOR THE LAND RECORDS SYSTEM FOR THE GREATER EDENDALE AREA

DESIGN CRITERIA	INFORMATION TYPE	G, A, or S	CHAPTER
THEME 4: ACCESSIBILITY TO THE COMMUNITY			
(a) DESIGN OF SYSTEM	The land records system should be designed so that it is accessible to the community in the GEA, especially the poor and/or illiterate	S	2, 6.
1. LOCATION	Land records system must be locationally accessible to anyone who has a right to the information, especially at the local level to the communities in the GEA.	S	2, 6.
2. COST	Land records system must be economically accessible to the poorer sectors of the communities in the GEA - cost of accessing and acquiring the data should be nominal.	S	2, 6.
3. OPERATION AND UPDATING	The system should be designed to be operated and for the data to be updated by members of the local community, who should be trained in these matters.	S, G, A	6.
THEME 5: USER - FRIENDLINESS			
(a) DESIGN OF SYSTEM	Users' needs and requirements for data, and storage and output modes to be determined. The land records system user interface, storage and output modes should be extremely user-friendly so that it is understandable and appropriate for non-expert users.	S	2, 6.

KEY [Type of Requirement]: **G = Graphical (spatial) data** **A = Attribute (non-spatial) data** **S = System requirements**

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LIST OF PEOPLE INTERVIEWED / CONSULTED

Mr B Bassett	The City Planner, head of Department of the City Planner of the PMTLC.
Mr O (Sanele) Shabalala	Senior Urbanisation Officer in the Department of the City Planner, which deals with planning issues, as well as matters relating to informal settlements and urbanisation.
Mr D Peckham and Mr G Bennett	Members of Land Data Services CC, a fairly recently established close corporation formed by ex-employees of DDA (Peckham) , KZNPA (Bennett) and the Surveyor General's office. As such they are experts on matters such as tenure, and subdivision and land use control in the former DDA- and KZNPA- controlled areas, such as the GEA.
Mr O Greene	Professional land surveyor and Partner of Tarboton, Holder, Ross and Partners, the oldest firm of Land Surveyors in Pietermaritzburg. They have worked extensively in the GEA and have also established a Land Information System of this area. The TLC has acquired the use of this information system. (Mr O Greene has recently left this firm and is sole member of a new venture called Greene Land, specialising in the same type of work).
Mr M Greatwood	Chief Sewerage Engineer (and currently Acting Divisional Engineer: Water and Sewerage) in the Department of the City Engineer of the PMTLC.