

# **Are Engineers People?**

**An investigation into the approach of Civil Engineers to development  
in South Africa**

By

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## **ABSTRACT**

Engineers have throughout history performed an important role in the technical advancement of mankind. The record of development in the less developed countries of the world, however, has been less than successful. These countries are littered with monuments to failed development programmes that have incurred immense financial, economic and social costs. Among the primary causes of failure are the inadequate attention to the details of the social and political dimensions of development, and a tendency by engineers to presume that their common sense view of the world is sufficient. This situation is exacerbated by the fact that frequently engineers have found themselves to be in the position of sole arbiters of development projects.

For most of the latter half of the twentieth century engineers have been constrained by the complexities of their technology to confine themselves to providing technical solutions to the needs of society. In the 1980s however society, at least in the First World, started to become increasingly concerned with environmental degradation and perceptions of diminishing resources. These concerns and the economic and financial costs of failed development, have led to concerted efforts to re-examine the processes of development.

Successful development is driven by social and political understanding and commitment combined with innovative and appropriate technology. These require knowledge of the historical context of each society, an understanding of the concept of community, and an ability to recognise the requirement for interdisciplinary relationships.

In South Africa in the 1990s there is strong political commitment towards the elimination of poverty and to development in rural areas. This has been translated into action through the Reconstruction and Development Programme. Much of the responsibility for its implementation falls on civil engineers. It is important therefore that engineers gain a better understanding of development theory, and of the complexities and diversity of development action.

This study briefly examines development theory and the role of engineers as development practitioners, and considers two examples of rural development. The study concludes that engineers perform a pivotal role, and that a co-ordinated multidisciplinary approach with improved capacity, responsibility and accountability in local government are key ingredients for a successful development programme.

## **PREFACE**

The work for this study has been carried out over a period of about fifteen years from the time when the author first became involved in rural development as a consulting engineer. The need for a multidisciplinary approach was always recognised but was not always adopted effectively. The tendency towards arrogance in assuming the correctness of the training of ones own discipline has hopefully been overcome in later years! In 1994 the author approached the Department of Sociology at the University of Natal, Pietermaritzburg, for assistance in extending his knowledge of development across disciplinary boundaries. This research is the result of that co-operation.

These studies present original work by the author and have not been submitted otherwise in any form to another University. Where use has been made of the work of others it is duly acknowledged in the text.

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The people of the Limehill Complex and Ekuvukeni who have come through extraordinarily difficult times with undaunted spirit and who have borne with equanimity the interference of an engineer who had little knowledge of their circumstances.

## **LIST OF ABBREVIATIONS**

CEAC	Civil Engineering Advisory Council
DBSA	Development Bank of Southern Africa
DDA	Department of Development Aid
DLG&H	Department of Local Government and Housing
ELDC	Ekuvukeni Local Development Committee
FIDIC	Fédération Internationale des Ingénieurs-Conseils
GDP	Gross Domestic Product
GNP	Gross National Product
IDF	Integrated Development Framework
KZDOW	KwaZulu Department of Works
LCUWC	Limehill Complex Umbrella Water Committee
NGO	Non-Governmental Organisation
PHB	Provincial Housing (Development) Board
PSC	Project Steering Committee
RDP	Reconstruction and Development Programme
SAICE	South African Institution of Civil Engineering
TJSB	Tugela Joint Services Board
VIP	Ventilated Improved Latrines
WEDC	Water Engineering and Development Centre

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## 1.0 INTRODUCTION

*The past quarter century has been a period of unprecedented change and progress in the developing world. And yet despite this impressive record, some 800 million individuals continue to be trapped in what I have termed absolute poverty: a condition of life so characterised by malnutrition, illiteracy, disease, squalid surroundings, high infant mortality, and low life expectancy as to be beneath any reasonable definition of human decency.* (Robert McNamara, 1978, Foreword to World Development Report)<sup>(8)</sup>

The statement above by Robert McNamara is as relevant today as it was in 1978. If anything the rate of change has increased and 'progress' has been even greater, yet the number of people in absolute poverty has also increased. This is in spite of tremendous increases in development expenditure, and the ever increasing political and economic focus directed towards 'development'.

Engineers have been at the forefront of development throughout history. It is appropriate, therefore, to examine their role and the ways in which their contribution can be improved, with particular emphasis on South Africa.

Traditionally engineers have confined themselves to providing technical solutions to the needs of society. Their efforts within this narrow definition have been an undoubted success and there have been increasingly dramatic advances in technology and its application in the twentieth century. The results are clearly visible in the developed world - transportation systems, dams, sanitation, space exploration, buildings, computers, electricity, communications - the list is endless. However, this has not been the case universally. While remarkable progress has been evident in the advanced, industrialised countries, the backwardness of the former colonial and neo-colonial world is equally notable. It is only in the period after the Second World War when what is referred to as the Third World came of age that questions began to be asked about the social, environmental and developmental implications of these advances.

This questioning was confined to political and social organisations outside of and not directly involved in technically driven processes. But more recently these issues have become more integrated into mainstream development – first, with regard to the environment, and subsequently with regard to social and institutional needs.

Historically, engineers have operated largely in an unquestioning way within the dominant development paradigm. For much of this century, this paradigm has typically been one of modernisation.

It is the purpose of this study to examine typical approaches characteristic of engineering practice and to examine them against development theory. These will be located in a context of models of development and their implications discussed for future engineering practice, sustainability and meeting the needs of people, especially in the developing world. Particular case histories will be examined as illustrations to the discussions

## 2.0 ENGINEERS AS TECHNOCRATS

Bozzoli<sup>(4)</sup> notes that “.. the word ‘engine’ originally meant ‘ingenuity’; but because of spelling inconsistencies came to be applied to the product of the ‘Ingenieur’, the ingenious man, the planner and thinker, and finally to the man himself.” The earliest ‘engineers’ were not purely technologists but were thinkers well schooled in philosophy and the arts. But with the dramatic expansion in scientific knowledge in the nineteenth and twentieth centuries, engineering research and the teaching of engineering have come to concentrate almost exclusively on technology. Engineers have established a position in society where “...no cohesive picture exists of the part played by engineers in establishing and improving our way of life”<sup>(4)</sup> and “...(the) ordinary citizen is confused when he or she tries to form an assessment of the profession”<sup>(4)</sup>.

Engineers are educated in the formalised application of technology. They tend to be discipline specific and (natural) scientifically driven. Invariably they work within projects the shape and direction of which are generally determined by financial, business or policy requirements which are largely outside their spheres of influence. They are the men (only sometimes women!) who are called in usually to deliver some form of service, which is essentially technically defined. They seek to meet human needs – provision of water, sanitation, roads etc. – in a way in which the social dimensions have been incidental at least until now.

In the contemporary context of the RDP, for example, the engineer defines the project and the budget to meet technical requirements. The policy supporting the RDP stipulates additional, social (in fact, understood largely as training) requirements, which dictate that the engineer must allocate a part of the overall budget to accommodate them. The conventional recommendation is that a minimum of 5% of the project cost should be allocated to training. Invariably engineers then allocate exactly 5% and they do this with limited assessment and knowledge of the real training needs of the community. More importantly, they rarely make any concession to other social, institutional or political requirements, which often affect the realisation and outcomes of the project. There is some consultation but it is constrained by the way the purpose of the project has been defined – to deliver a technical output on time and within budget.

Before the RDP, almost without exception, even these limited sorties into the social issues of development would have been ignored.

Within the new approach, many engineers view the social requirements grudgingly. They often cannot accept that they have any value. They see them as a tax on their time and an unwarranted imposition on the budget and on the programme. Probably unintentionally and due to a lack of understanding, they then tend to execute this responsibility in a minimalist and perfunctory manner or to delegate it to facilitators who fall under the direction of the engineering component, and are often poorly qualified and lack adequate authority.

Bearing in mind that engineers frequently take overall responsibility for project implementation, they too often presume that they have the expertise to fulfil the social requirements. They do not question the limits of their own knowledge in this field. Rather, because they are people, they presume to know. But what do they know? Where is their expertise and training? It is not in people or the social systems in which they operate. On the contrary, in common with most people, they have a very limited and particular knowledge gained as members of a fairly narrow stratum of society. In South Africa, this partiality is aggravated by the history of segregation and colonialism. This is particularly so in development projects where engineers are predominantly white and come from privileged backgrounds, and where the subjects of development are usually black, poor and have had little or no formal education. Engineers then take shelter in a common sense view of the world without recognising that understanding people is a science and a field of expertise in its own right.

This somewhat harsh criticism of the role performed by practising engineers working in the field in the development arena is tempered however, by the growing body of literature generated by engineers which reflects on the requirement for a wider perspective. J.P. du Plessis states <sup>(14)</sup>:

“Furthermore, the cultural and socio-economic significance of engineering has been seriously underestimated. . . . Buildings and infrastructure. . . shape the way we live. . . and ultimately how we think, either directly through the practicalities of use . . . or indirectly through their long term aesthetic and ideological impact.”

Similarly the Minister of Public Works, J.Radebe, suggests that <sup>(26)</sup>:

“In the past the engineering profession operated within a clearly defined technical framework. The socio-economic dictates in South Africa today, call for a radical review of this framework as engineers are now required to shift from these narrow confines and fulfill the role of nation builders in our economy.”

All the experience of development action in and beyond South Africa indicates that projects stumble on the rock of inadequate and often inappropriate consideration of social and political issues. It is important, therefore, for engineers to reflect on their social inexperience, especially given the pivotal position they occupy in the delivery of development projects.

As a first step it is necessary to examine how the notion of development is understood both theoretically and then in terms of delivery by those involved such as engineers.

### 3.0 DEVELOPMENT

#### 3.1 Development Perspectives

The word development means different things to different people. To technocrats it may imply the delivery of improved services and facilities; to economists it may suggest, at a macro level, economic growth measured by increases in statistical indices such as GNP, and at a micro level increased levels of savings and improved business opportunities; to politicians it could mean a combination of economic growth and the successful implementation of policy which leads to the retention of power; to sociologists it could mean improvements in the "quality of life", a reduction in poverty, and an increase in a more equitable distribution of wealth. The definition of development also changes over time with increases in knowledge, environmental changes, and variations in the needs and aspirations of people.

Todaro quoted in Burger<sup>(6)</sup> suggests that the three core values of development are:

"...high standards of living, almost total freedom of choice and high self-esteem. These goals must be met and maintained without detrimental effects to other people."

Coetzee and Ligthelm<sup>(11)</sup> expand on Todaro's formulation of the three vital objectives in all societies:

- ➡ to increase the availability and widen the distribution of basic life-sustaining goods such as food, shelter, health and protection;
- ➡ to raise levels of living (in addition to higher incomes), by the provision of more jobs, better education and greater attention to cultural and humanistic values, all of which serve to enhance material well-being and generate greater individual and national self-esteem;
- ➡ to expand the range of economic and social choice to individuals and nations by freeing them from servitude and dependence, mostly in relation to other people and national states, but also to the forces of ignorance and human misery."

However development is perceived it nevertheless concerns people:

“people experiencing the reality within which they find themselves day by day and moment by moment, feeling its implications and seeing its practical functioning among them” <sup>(19)</sup>.

It is concerned with relieving material or spiritual distress measured against some agreed standards, and the right of every person to live a meaningful life. It is necessary therefore to move beyond the statistics which purport to reflect development progress such as increases in per capita income or GDP which often serve only to hide conditions of real need and extreme poverty.

“Policies and strategies directed mainly at the control of natural settings, technological considerations, economic structures and demographic conditions will therefore have to be replaced by policies and strategies that recognise concomitant values, customs, social structures and political participation.” <sup>(4)</sup>

It is of course comparatively simple to solve development “problems” solely through improved technology, public works, industrialisation, improved administration and similar positive actions even though these may indeed be necessary. They require merely the effective management of resources and expertise. It is equally important however, to pay attention to less easily defined actions such as

“... providing opportunities for participation, recognition of social justice, education, the abolition of poverty and inequality as well as the institution of community development that can lead to social reconstruction and the provision of meaningful existence.”<sup>(11)</sup>

This alternative conceptualisation of development has been the subject of much research and conflicting opinion. There exists a vast international literature dealing with the theory and practice of development, which emphasises the complexity of the subject. It is important therefore, when approaching development from a technological perspective to be aware of this complexity and to understand that development objectives are more wide ranging than the mere provision or upgrading of services.

### 3.2 Models of Development

The dominant paradigm of development, which informs most development projects, is that of modernisation. Essentially, this model postulates that development is a hierarchical and linear process that occurs in stages. It holds that societies move from “primitive” agricultural systems to “advanced” industrial status. With contemporary technological advances, further stages of development have been added which emphasise environmental protection, information technology and globalisation. Nations or regions that rely on agriculture are seen as more backward and less developed. Those that are industrially driven are regarded as modern and more developed, with the most advanced today progressing into the electronic age. Adherents of this model believe that all societies could expect to, and in fact should, follow the same path as the only route to development. The experience on which this model was developed lies in the history of Western Europe and North America. The model (theory) was born in and out of the conflict between capitalism and socialism and has survived into the post-modern era. The theory assigns general characteristics to traditionality on the one hand and modernity on the other, and assumes that the linear transition from one to the other is possible. With few exceptions, such a linear progression has proved to be unrealisable in the Third World, not least of all because of the specific social and historical contexts of these societies.

Modernisation theory has been accused of closing its eyes to the fact that modernisation, let alone Westernisation, is by no means a universal pattern; that many Third World countries, having started out on the path of modernisation, did not complete the journey, but settled down into a variety of structures that were neither traditional nor modern and most certainly had little in common with those of the West, while others most clearly chose a communist rather than a Western path to development. (Etzioni-Halevy, 1982)<sup>(11)</sup>

As an expression of revisionist modernisation theory Etzioni-Halevy’s critique still operates within the assumption that development is a staged progression where the originating society’s structure is construed as either absent or backward. – a blank page on which to “do” development. It is an assumption that has no basis in reality. Can development be done (unto others)? Historically, development was never “done”, so what does “doing development” mean?

In the late sixties the failures of development, particularly in Latin America, spawned a vigorous critique of modernisation theory. Termed dependency theory, it held that inequalities between nations shaped the course of development. This meant that third world countries could not develop because their progress was impeded and controlled by exogenous influences:

“...top down approaches to development create an increasing dependence of the people on outside resources and also sharpen social divisions. Moreover the cost of this approach to welfare and development is so high that no government in any low-income country can reasonably expect to meet the needs of all its people in the near future.” (Askew, 1983, cited in Burkey, 1993)

The relationship of the Third to the First world was not of a son to a father, where less developed countries could grow into a similar position over time, but rather one in which they remained in a permanent state of childhood or dependence. Permutations of this theory were applied to South Africa, and elsewhere, as the core-periphery debate in which dependence was assumed to exist between nations, and also within them. Thus, for example, in South Africa a core-periphery relationship is said to exist between the towns and cities (the core) and the rural areas (the periphery - the former reserves and commercial agriculture) where the latter service and support the former. This relationship was reinforced by legislation in the apartheid era.

Subsequent critiques, which built upon the primary concerns of this theory, raised the questions of whose needs should be addressed in development, who should be responsible for the identification of these needs, and who should address them.

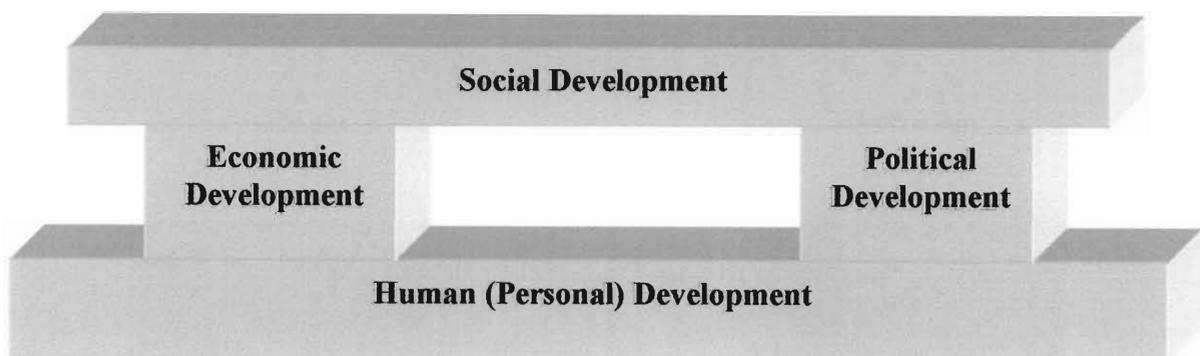
In spite of these critiques, the modernisation paradigm still dominates, albeit in a form modified by the criticisms and by the failures of development projects. The focus of development thinking has progressed from modernisation theory, which is based on the belief that development can be achieved through replication of the experience of the Western world since the industrial revolution, through the dependency theory of underdevelopment, global interdependence, the basic needs approach, and ecodevelopment, to participatory development and development from the bottom up. None of these conflicting theories have been accepted or discarded in their entirety although each has tended to modify the other –

“Unfortunately, few theories and strategies die when their weaknesses and deficiencies are exposed by new thoughts and strategies. We live in a world today which is cluttered with -isms, -ologies and declarations of principle. Where does this leave the poor peasant and his family?”<sup>(7)</sup>

All people live in a social framework that is transformed through a dynamic process of development. There is general agreement that since development may be broadly defined as being concerned with the elimination of poverty and the equalisation of opportunity, that it contains human, economic, political and social elements. Each of these contains sub-elements that serve to describe more fully the actions and ideas falling logically under the main headings. Burkey <sup>(7)</sup> suggests the following typical paradigm:

<b>Human</b>	<b>Economic</b>	<b>Political</b>	<b>Social</b>
Self-respect	Use of resources	Responsibility	Community services
Self-confidence	Savings	Responsiveness	- Health
Self-reliance	Management	Stability	- Education
Co-operation	Entrepreneurship	Democracy	- Infrastructure
Tolerance	Profitability	Power devolution	- Energy
Participation	Reinvestment		- Communications

The diagram below represents Burkey’s suggestions of the relationships between each of these elements:



Social development is depicted as depending on the support of economic and political development which, in turn, rest on the foundation of human development. It is noticeable in this example that the contributions by engineers would fall under and form a small part of social development. While most modern engineers would consider, albeit unconsciously, that their activities benefit society, they would be unlikely to place them under such a heading. The education and training of people in professions such as engineering, medicine, finance, management and pure science tends to be rigidly mechanistic and frequently ignores the human and social aspects of the application of technology. The question following from this brief overview is where do engineers see themselves as conscious actors in development?

### **3.3 Engineers and Development**

The United Nations declared the decade beginning in 1960 as The Development Decade and the 1970s as the Second Development Decade. These were followed by the Women's Decade and the Water Decade. They were built around different theories of development and different perspectives of priorities. Each involved development theorists and practitioners at all levels. Each generated high expectations of success which were not fulfilled –

“The Third World is today littered with clinics, hospitals, training schools, water systems, community centres, and other social institutions which are dilapidated or in a terminal state of decline”<sup>(7)</sup>

Developing countries currently invest about a two hundred and fifty billion US dollars a year on services and infrastructure. In the last two decades or so there has been a dramatic increase in the availability of services to people in developing countries. For example globally there was a fifty per cent increase in the number of households with access to clean water. But most will acknowledge that the picture is not all rosy<sup>(28)</sup>:

“1 000 million people still do not have access to clean water  
2 000 million people still lack adequate sanitation  
2 000 million people do not have access to electricity  
Millions of people do not have adequate transport facilities  
Uncontrolled and rapid urbanisation results in large-scale poverty”

Despite the huge amounts of money and the application of millions of man-hours of ‘expert’ effort, the results have been disappointing and ineffective. The Canadian International Development Agency commissioned a study the results of which were reported by Léger in 1984. <sup>(7)</sup> Seven main reasons for the failure of development projects were identified:

1. Target groups are not homogeneous;
2. Technological options do not always correspond to the motivations of target groups and to the constraints of the environment;
3. Equitable distribution of revenues and benefits may be a myth;
4. Government and NGO strategies for project conception and implementation do not necessarily represent the aspirations and interests of target groups;
5. The human and social factors are too often neglected;
6. Projects are planned in a rigid manner, based on an overly idealised economic, political and institutional environment;
7. The already existing or newly created organisational entities do not foster efficient/effective project management.

It is interesting to note the somewhat conflicting references to “target groups” and the neglect of “human and social factors”. It suggests a development process that is still externally identified and driven towards a “target” in spite of the implied emphasis on local participation and involvement.

In the ten years since that study little appears to have changed. In the World Development Report of 1994 the following causes of poor performance in the delivery of infrastructure are identified <sup>(11)</sup>:

1. *A lack of competition*: Most services are dominated by centrally managed monopolies characterised by lack of competition and inefficiency.
2. *Managerial and financial autonomy*: The people responsible for the delivery of services are rarely given financial and managerial autonomy. They suffer from problems such as poor definition of objectives, enforced delivery to serve purely political ends, lack of public accountability, and frequently being employers of last resort.

3. *A lack of response to the demands of users:*

- Demand is difficult to assess when there is a history of under recovery and subsidisation
- Poor maintenance leads to demand for new services that may be unrealistic – it is said that if ten billion US dollars had been spent on maintaining roads in Africa over the last ten years, Africa could have saved fifty billion US dollars in new road construction to replace failed roads!

Again the reasons cited for poor performance and delivery are related largely to external management deficiencies and ineffective policy.

The Reconstruction and Development Programme, commencing in 1994, is the most significant formalised and coherent development initiative aimed at addressing past inequities and the elimination of poverty to be instituted in South Africa. The approach by engineers to this programme has been ambivalent. Some have welcomed it and have contributed strongly towards its combination of technical, social, economic and political objectives. Many more however are uncomfortable with a programme which is not driven solely by the common engineering targets of technical excellence, and completion of a project, usually determined by others, on programme and within budget.

### **3.4 Engineering Institutions and Policy**

The public standpoint of engineers is conducted through a wide variety of representative bodies. An examination of the professional and trade literature generated by the profession shows increasing concern for the natural and human environment. The professional institutions which represent the interests of engineers, and in particular civil engineers who operate in the branch of engineering most involved in development, have gradually begun to recognise its complexities and to evaluate their roles in the process. There is a body of recent evidence showing the increasing concern by engineers for what are termed the 'soft' issues of development, and for systematic solutions which consider the whole as a collection of parts which interact with each other. Hard systems deal with problems where the end result, or objective, is known. In soft systems the end result is not known and the problem therefore is to determine the outcome.<sup>(33)</sup>

*Civil Engineering*, the magazine of the South African Institution of Civil Engineering (SAICE), is published monthly and in 1997 approximately 22% (25 out of 112) of the articles in the magazine had development issues as their subject. (In 1998 this increased to approximately 27%.) While many were case studies of development projects and were to some extent uncritical trumpet-blowing exercises showing off the skills and contributions of particular individuals or firms, nevertheless this degree of attention signifies very real concern with development problems. A number of the articles dealt with policy and the possible influence of engineers in informing policy change. Four articles were written under the heading of social empowerment. However all were written by engineers and very few if any identified a need for the combination of expertise from other disciplines in development practice.

Since 1996 the SAICE has published special annual 'Outreach' editions which are directed towards development issues and projects, and to publicising the role of civil engineers in development. Lawless<sup>(22)</sup> quotes from Harry Seftel, Professor of Medicine at the University of the Witwatersrand:

“The modern civil engineer has done more to improve the health and life span of man than all the advances in medical science.”

She then states:

“The key contributing components in the above statement are potable water, water-borne sewerage and safe, weather-protected housing. . . . .the emphasis in the civil engineering industry has shifted from the planning, design and construction of major landmarks and bulk infrastructure to monuments to human need – economic housing and infrastructure in the rural and peri-urban areas.”

Similarly recent institutional conferences have been directed towards consideration of developmental problems and the contribution of engineers to their solution. The 7<sup>th</sup> Annual Congress of the SAICE in 1996 was entitled “Engineering on the Move”<sup>(15)</sup> with sub-themes of Capacity Building, Africa Beyond our Borders, Labour Intensive Construction, Management, The Role of Consultants, Transport, Urban and Rural Development, and Water Supply and Sanitation. Many of the papers presented at the conference identified community participation as a problem area emphasising what

they viewed to be detrimental effects on project completion and the delivery of services. Downie notes that the (high) cost of community participation in housing projects is between 2% and 3% of the housing board subsidy and states <sup>(15)</sup>:

“We must not accept that this is an inevitable part of the development cost. A programme of generic education in development related issues could save a substantial portion of this figure. The reduction in delays and frustration which accompany the community participation process would have further financial and social benefits.”

It could be argued that this negative response shows a particular understanding of development as essentially one of participation where the solutions are determined by technocrats.

A number of papers questioned the approaches adopted by civil engineers to development. Rossouw suggests <sup>(15)</sup>:

“Are we not guilty of rushing in to appease the politicians without fully researching the economic needs, aspirations, abilities and future stability of the people involved?”

All of the papers were presented by engineers, and the majority by consultants and academics. None of them promoted an inter- or multidisciplinary approach.

The 23<sup>rd</sup> WEDC (Water, Engineering and Development Centre, Loughborough University) conference held in Durban in 1997 was entitled “Water and Sanitation for All”. Under this rubric, many of the papers were presented by development practitioners who are not engineers, and almost all of the papers dealt with particular project related experiences. Very few were of a purely technical nature. In this sense therefore the conference recognised the involvement and necessary contribution of a variety of disciplines to development. Even so few of the papers were presented from a multidisciplinary perspective.

The 9<sup>th</sup> Annual SAICE Congress held in April 1998 had the theme “Civil Engineering and Sustainable Development.” The introductory documents to the Congress noted the following:

“It is a further manifestation of the changing role of those active in Civil Engineering – the evolving change from the technocrat who would ensure that a solution to a problem was technically correct, to the modern practitioner who needs to ensure that it is the right solution to meet the needs and aspirations of our customers.”

Some of the papers were presented by non-engineers which suggests that there is recognition that engineers do not have the expertise or training to provide all the solutions to developmental problems.

The civil engineering industry is represented at a political level by the Civil Engineering Advisory Council (CEAC) whose members are appointed by the Minister of Transport in their individual capacities. The Mission Statements of this body is <sup>(9)</sup>:

“CEAC through its representation from all sectors of the civil engineering industry strives to increase the impact of the industry on development in South Africa by advising Government and the industry, and by acting as a communication link between industry and all levels of Government and by also acting in a facilitative mode regarding development issues between communities and the industry.”

The Annual Report of the Council for 1996-1997 <sup>(9)</sup> describes its deliberations and achievements, and the results of its consultations with other representative bodies of the profession.

In addition to this formalised relationship between the civil engineering industry and government there are a plethora of other organisations which represent particular interest groups and which also lobby government. These include the following:

- The South African Institution of Civil Engineering (SAICE),
- The Engineering Council of South Africa (ECSA),
- The South African Association of Consulting Engineers (SAACE),
- The South African Federation of Civil Engineering Contractors (SAFCEC),
- The Institute of Municipal Engineers of South Africa (IMESA),
- The Local Government Training Board (LGTB),

- The National Black Contractors and Allied Trades Forum (NABCAT),
- The South African Black Technical and Allied Careers Organisation (SABTACO),
- The South African Road Federation (SARF),
- The South African Local Government Association (SALGA),
- The South African National Communities Organisation (SANCO)

Most of these organisations attend meetings, where others are also represented, in various forums to discuss mutual problems and to co-ordinate approaches to civil engineering issues.

It is appropriate to focus on the consulting engineering branch of the profession. Consulting engineers traditionally operate in the first phase of any engineering project being appointed by a client firstly to redefine and conceptualise a demand in engineering terms, and then to go through the process of preliminary design and cost estimates, comment and approval, final design, and supervision of construction by the contractor. Increasingly the consulting engineer of today is called upon to play a larger and more inclusive role. This includes accepting responsibility for new delivery systems, accountability for total project delivery, and responsibility for seeking ways to enhance the natural and social environment.<sup>(16)</sup> In an editorial in the SAICE magazine it is noted that<sup>(10)</sup>:

“The composition of the engineering team has changed dramatically and could now include social science experts, among others. Minister Asmal (Minister of Water Affairs and Forestry) sees a need to encourage the development of career paths in water, including specialists from the non-engineering professions.”

Small beginnings in this direction can be noted in South Africa, but their inclusion has yet to give equal weight to non-engineers in the decision making process at project level.

Internationally the consulting engineering industry is represented by the Fédération Internationale des Ingénieurs-Conseils (FIDIC). In the third draft report<sup>(16)</sup> issued in August 1997 by Task Force 21, a body established by FIDIC to guide the industry into the 21<sup>st</sup> century, it is noted that:

“The composition of the professionals within the consulting firms is evolving as quickly as the assignments they undertake. In many cases, the consulting engineers have taken on the role of system integrators and facilitators responsible for a broad scope of services. Many other disciplines are now very common in many firms.”

A finding of a survey conducted by FIDIC among Member Associations showed that in consulting engineering firms:

“Engineers predominate, with a majority (68%) reporting no other professions. However, this does indicate a significant minority with non-engineers, even with other professionals as dominant in some individual firms. The study suggests that this trend will increase.”

The issue from the perspective of the consulting engineer is succinctly set out in the introduction to a chapter on the Vision, Mission and Objectives of FIDIC:

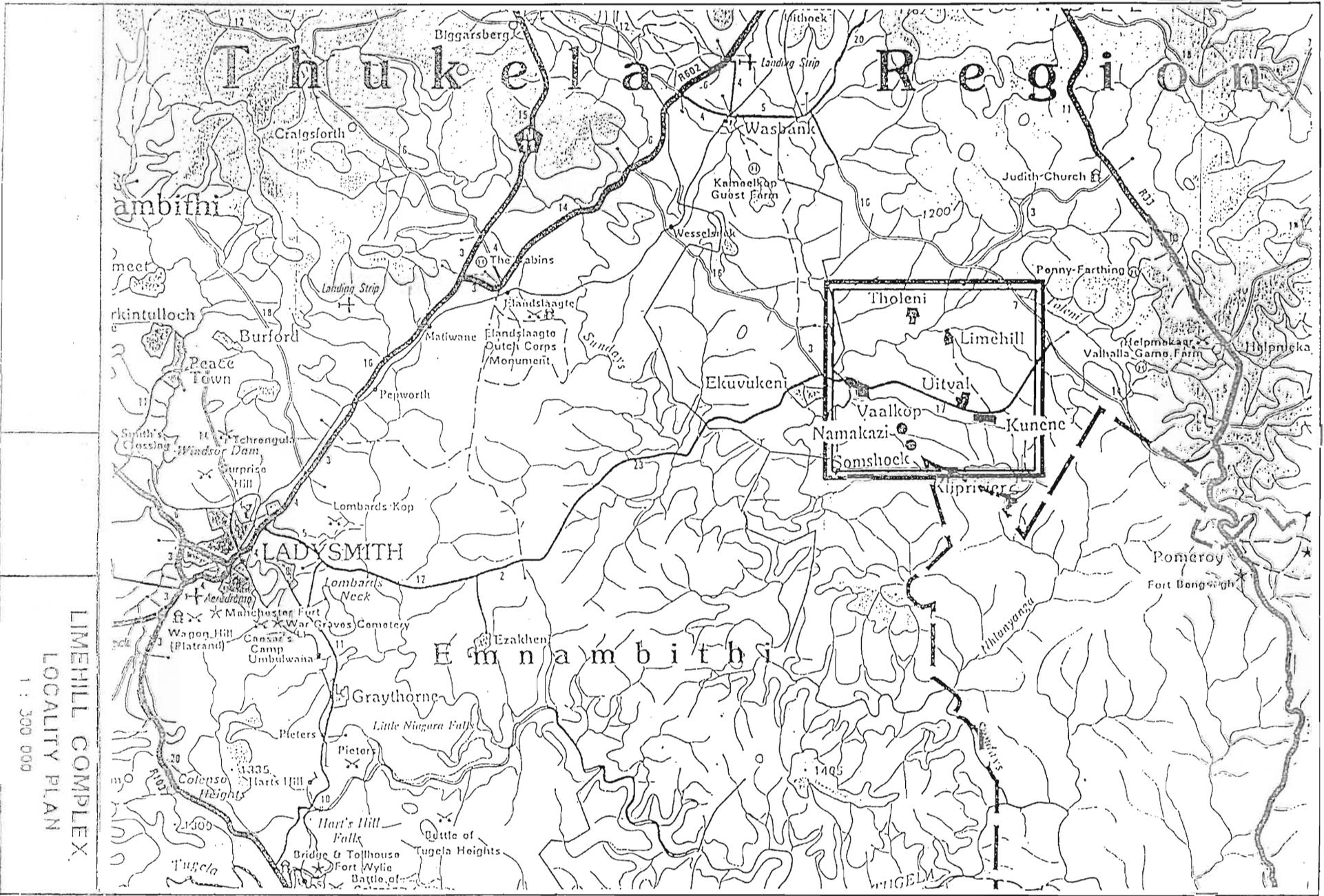
“The consulting industry is obviously a product of the development of the society of which we all are part. The strength of the consulting industry is that it is knowledge based and because of that it is naturally in the forefront of development. Its services are innovative and creative, being much in demand and being an essential foundation for a number of other developments. The consulting industry plays an important role in society as a representative of high professional and ethical standards, which is key to our role as ‘independent’ or impartial consultants.”

“One of the weaknesses of the consulting industry is that we sometimes focus too much on the professional side of our image and forget our obligations in the wider social and political context. We are not getting our due political and societal influence because we do not understand that this is part of our obligation to society as well.”

“Consulting engineers are indispensable in any society for the delivery of many elements/infrastructure needed by society. Opportunity exists in the challenge to develop the business and social role over the pure professional role and to become a service industry with a clear focus on our mission and programme.”

In the post-modern era the engineering professions have been motivated principally by the dramatic advances in technology. More recently, driven to some extent by growing public perceptions of a rapidly deteriorating environment, engineers are assuming a more holistic approach to the benefits that they can bring to mankind through the appropriate application of that technology. It is a difficult transition since it requires a paradigm shift towards a more inclusive role in development. The

following case studies examine the practice of engineers in rural development. The development scenarios are typical of many in which engineers are involved at present. The discussion that follows the case studies attempts to set the role played by engineers in the context of development theory and government policy in South Africa.



LIMEHILL COMPLEX  
LOCALITY PLAN

1 : 300 000

Figure 1

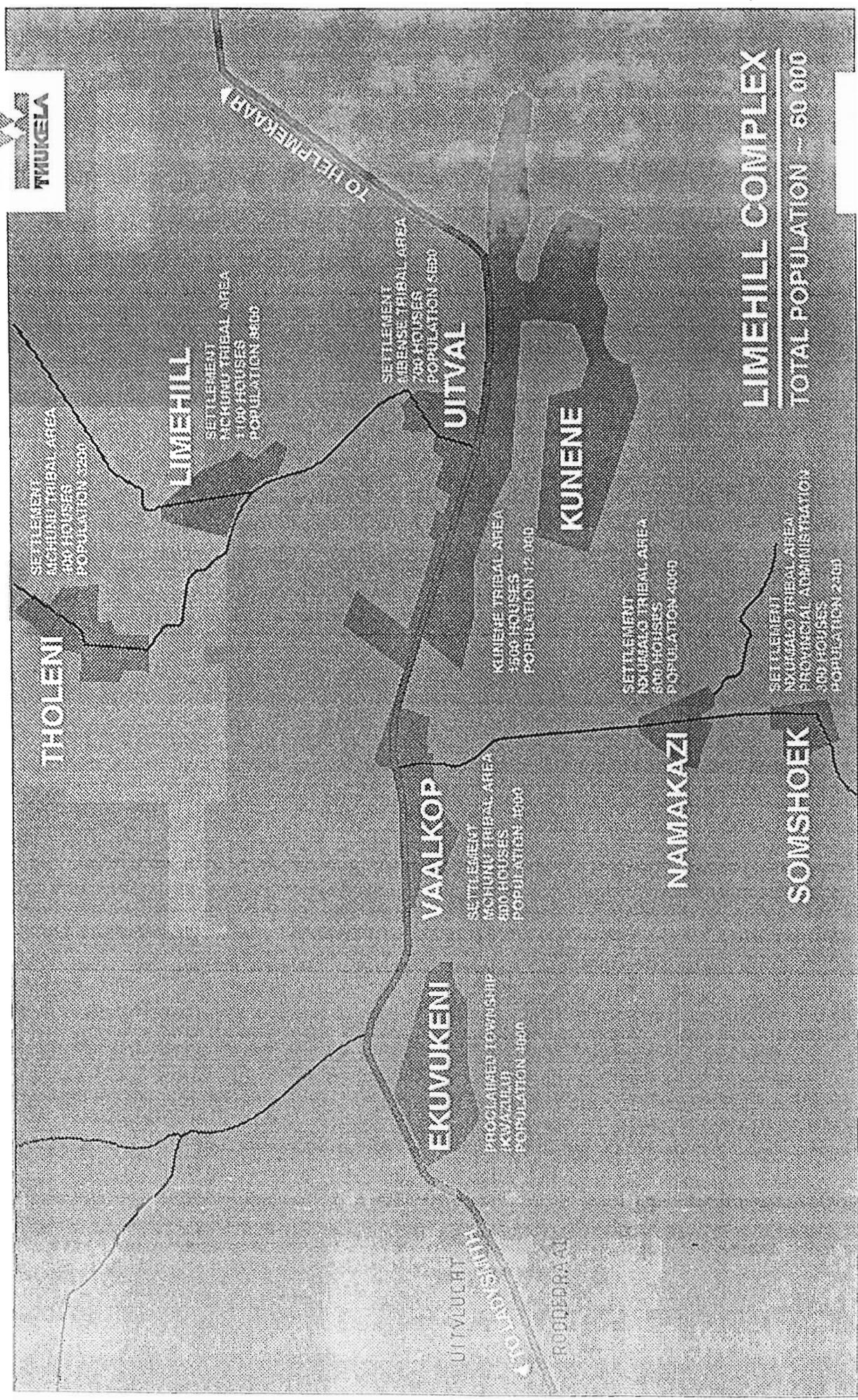


Figure 2

## **4.0 CASE STUDIES**

The two case studies that follow are typical of development projects in which the author has been involved as a consulting engineer from 1985 to the present. Generally the work has centred around the provision or improvement of infrastructure services in rural or semi-rural areas. In both cases the need for each project has been identified by an external agency. The needs and priorities of local residents generally have been presumed by the authorities, and at least initially by the consulting engineers as well. Although the intentions have been good and there were genuine and often strenuous attempts at consultation and encouragement of community participation, these efforts were made from a background of technical solutions to development requirements by engineering personnel operating within their own life experience. The discussions which follow the case studies will examine these projects in relation to development theory reviewed in Section 2.

Both case studies are on projects in rural or semi-rural settlements in the Emnambithi sub-region of the uThukela district of KwaZulu-Natal. The location is shown on the maps in Figures 1 and 2.

### **4.1 The Limehill Complex**

#### ***4.1.1 Introduction***

The settlements comprising what has now come to be known as the Limehill Complex were established under the political and social doctrines in place prior to the election of the new government in 1994. Typically such communities were located in townships established outside urban centres, in peri-urban sprawl, and in rural areas. Under post-1994 legislation, most of those reasonably close to urban areas have come under the authority of metropolitan and transitional local councils based on old local authorities. These therefore have some institutional capacity for managing development, operation and maintenance. The situation regarding rural areas however is considerably more confused.

Rural population settlement patterns comprise small towns and villages, dense settlements, scattered dwellings, and commercial farms and farmhouses. Administration and development of these areas occurs through a range of centralised provincial government departments, Regional Councils and tribal authorities. Responsibilities for various line functions are almost entirely separate and frequently uncoordinated. <sup>(32)</sup> The Limehill Complex is a typical group of dense rural settlements with limited

local institutional capacity.

The history of the area has led to complex institutional and social dynamics. Originally a mixture of tribal land and land owned privately either by white farmers or black syndicates, from the 1960s white farms were expropriated and the area was used to place people subjected to forced removals from elsewhere. These new settlements were given rudimentary services free of all charges.

The forced influx and subsequent natural and voluntary growth has contributed to the significant dilution of tribal authority and conflict over land, basic needs and demands for services and opportunities. Large tracts of the expropriated land have remained state property and have not been allocated or developed. Nevertheless the tribal authorities, in the absence of any formally elected bodies or active civic associations, appeared to be accepted as the *de facto* locally representative organisation.

A project for the supply of potable water to the Limehill Complex was initiated by the engineering section of the provincial government department responsible for the provision, operation and maintenance of services in the area. As part of this project a programme of local institutional development and capacity building was initiated by the engineering team. The objectives of this programme included ensuring acceptance by the population of the principle of payment for services which was one of the primary objectives of the project. Additional long term objectives were integration of community organisations into local government structures, and the establishment of local responsibility for development and management of services. It was deemed to be appropriate and logical that such institutional development should be carried out around the supply of potable water. This was not only a major need identified by the local community, but also a service which the engineers believed could be implemented with full community involvement at all stages.

#### 4.1.2 Background

The Limehill Complex is situated in the Emnambithi District of KwaZulu-Natal approximately 40 kilometres east of Ladysmith on the main surfaced road between Ezakheni and Helpmekeer.

The Complex comprises eight towns at present, seven of which are as shown in the table below:

<b>NAME</b>	<b>No. OF HOUSES</b>	<b>POPULATION</b>	<b>TRIBAL AUTHORITY</b>
Vaalkop	800	6,400	Mchunu
Kunene	1,500	12,000	Kunene
Uitval	700	5,600	Mbense
Somshoek	300	2,400	Nxumalo
Namakazi	500	4,000	Nxumalo
Limehill	1,100	8,800	Mchunu
Tholeni	400	3,200	Mbense
<b>TOTAL</b>	<b>5,300</b>	<b>42,400</b>	

**Table 1 Populations of Settlements**

The numbers of houses were counted using colour aerial photographs taken in May 1994 and the population estimated based on eight people per household. The boundaries of most of the towns are not clearly defined and the extent of each town was established in consultation with the local community to ensure the cost-effective provision of water reticulation networks. A considerable number of people live in scattered households outside the agreed areas of each town. These were excluded from the house counts noted in the table above. It was decided that it would not be economical to provide services to these households, at least in the first phase of the development. The total population of the Limehill Complex including outlying households is estimated to be 60,000.

Administration in the past was the responsibility of various national government departments devolving in later years to KwaZulu government departments, with some involvement of Regional and Tribal Authorities. Typically departments were responsible for specific line functions carried out under a vertical organisational structure with little or no horizontal linkages. Development initiatives therefore, arose largely around technical improvements determined through perceived needs and departmental financial budgets and economic constraints.

At present administrative responsibility for the area lies with various provincial government departments including Local Government and Housing, Agriculture, Education, Health and Welfare, Works, Justice, and Traditional Affairs, as well as with the Tribal Authorities and the uThukela Regional Council. Efforts are being made at a number of levels to rationalise local authority structures, improve local capacity and improve co-ordination. The situation is complicated however by regional and local political aspirations, land issues and the protracted process of reorganisation of provincial government bureaucracies.

The original water supply to the towns in the area, installed in the 1960s, was rudimentary and in recent years delivered water of poor quality with a history of frequent failures. Under the authority of the former Department of Development Aid, a new dam, water treatment works and bulk water supply system was constructed in the 1980s. Planning records for the area at that time are unobtainable but it is likely that the new system was deemed to be necessary to serve existing and proposed new settlements planned to accommodate yet more people forcibly removed from other areas. At least two new settlements in the Limehill Complex, Uitvlugt and Roodedraai, were planned, laid out and provided with sanitation facilities but were never occupied (Figure 2). The operational responsibility for bulk water supply moved to the KwaZulu Department of Works in about 1990, and to the Tugela Joint Services Board (TJSB) in 1993. This organisation became the uThukela Regional Council in 1996 and set up a body called Emnambithi Regional Water Services (ERWS) with specific responsibility for water supply in the sub-region.

To establish a semblance of financial viability to the water supply scheme as well as meeting the desperate needs of the expanding population in the area, investigations commenced in 1992 to determine appropriate means for expansion and cost recovery. These investigations led to the development project described in the following sections.

### **4.1.3 Water Supply Project**

#### **4.1.3.1 Project Outline**

The initial motivation for a water supply project in Limehill came in 1992 from the Regional Engineer of the KwaZulu Government Department of Works. This Department was responsible for the provision and maintenance of services in the region and was operating both the new and old existing treatment works on a fully subsidised basis. The new plant with a capacity of 10 Mℓ per day was heavily underutilised supplying less than 1.5 Mℓ/day to the towns of Ekuvukeni and Waayhoek only. The old works supplied the remainder of the towns in the area and used outdated and uneconomical technology. New bulk supply pipelines and storage facilities were planned to serve the whole of the Limehill Complex from the new treatment works. The TJSB, later to become the uThukela Regional Council, took over responsibility for the project in 1993. The project team at this initial stage consisted of engineers from the Joint Services Board, the KwaZulu Department of Works, the Development Bank of Southern Africa, and the consultants.

At that stage in 1993 no consultations were held with local communities. Some consultation had been carried out however in general terms during the preparation of a Development Study commissioned by the KwaZulu Department of Economic Affairs and completed in 1991.<sup>(20)</sup>

Finance for both the bulk supply and reticulation elements of the scheme was obtained eventually from the Development Bank as a loan to the TJSB based on estimates prepared by the consulting engineers. Reasoning that it would be unwise to raise expectations which might not be met, and that the community was one which had already developed a high level of mistrust of state departments, the professional project team agreed that no discussions should be held with the local community until the availability of project finance had been confirmed.

The engineers gathered as much information as possible from technical and official sources only, and after a process of intensive internal discussion the project team developed a strategy for the implementation of the scheme. The strategy was proposed by the consulting engineers, based on their experience in the area as engineers on community projects for drought relief funded by the Independent Development Trust. These had been initiated and completed with significant community involvement. The strategy was devised however without any elements of social or political

assessment. This strategy established the responsibilities of each member of the team, and the primary objectives of the scheme. A preliminary organogram (Figures 3 and 4) was drawn up for a local institutional structure to be used to initiate discussions with the local community. It was noted that the provision of water free of charge in the past would be a major complicating factor in establishing a new supply system for which people would be required to pay. This in spite of the fact that the existing service was of poor quality, did not serve all of the population equally, and was often intermittent.

The sub-regional Development Study completed in 1991<sup>(20)</sup> revealed that the local economy relied primarily on remitted incomes and incomes earned by government employees. This suggested that affordability levels were likely to be low. The scheme was required to establish payment by consumers at a level sufficient to cover the costs of operation and maintenance. Therefore the design of the scheme had to be such that water consumption levels and tariffs would allow all of the “target” population to have access to the supply. Preliminary designs were carried out for water reticulation networks to provide street standpipes within a walking distance of 100 metres of every household. The designs were based on technical parameters and social information that was limited both in scope and weight.

#### 4.1.3.2 Project Implementation

Project implementation commenced in March 1994 and was planned to proceed systematically and logically through each town. The strategy was for the engineers to engage with local residents through the establishment of Water Committees. Ultimately and in order to take maximum advantage of economies of scale, it was proposed that a locally based authority would be formed as an umbrella body with representatives from each Water Committee. The idea was that this umbrella body would become entirely responsible for local distribution, operation and maintenance of the reticulation systems, payment for bulk water supplied, and for the collection of revenue from consumers.

The first step in the process of consultation with the community commenced with a meeting with the Amakhosi of the four tribal authorities in the area – Nxumalo, Mbense, Mchunu, and Kunene, together with the Chairman of the Regional Authority, iNkosi Sithole. At this meeting an outline of the proposed project was given by the project team. Examination of the minutes of the meeting shows

that most of the input at the meeting came from the consultants with no feedback of any significance from the Amakhosi. The KwaZulu Department of Traditional Affairs informed the engineers that the Amakhosi were the accepted community authority in the area. No further attempts were made to determine whether there existed any other community interest groups which should be consulted. It was assumed that the Amakhosi and their representatives (councillors, indunas, etc.) would inform any such groups or individuals of development proposals.

The Amakhosi appointed representatives to the Water Committees for each of the towns. These Committees were consulted by the engineers regarding the preliminary organogram for the proposed institutional structures. The proposals were accepted and the Committee representatives requested that the umbrella body be formed immediately and that this umbrella body take local responsibility for the scheme immediately. Again with authorisation from the Amakhosi, the umbrella committee was formed with two representatives from each local Water Committee. This committee was given the title of the Limehill Complex Umbrella Water Committee (LCUWC).

Permission was obtained from the Amakhosi to proceed with initial discussions with the residents of the first town to be provided with the new supply. The selection of the first town was governed entirely by technical considerations being the first which would be served by the new bulk supply pipeline. After two public meetings arranged by the Induna and attended by between 100 and 200 people (out of a population of more than 6000), agreement was reached on the principles of the project which would be acceptable and the process required for implementation. No detailed survey of the residents was carried out although this option was discussed with the LCUWC. It was agreed that the canvassing of opinion and the dissemination of information at that stage of the project would be the responsibility of the tribal authority. A representative of the KwaZulu Department of Traditional Affairs from Ulundi was invited and attended the public meetings to provide support for the tribal authority.

The engineering consultants had suggested to the TJSB that sub-consultants should be appointed with expertise in specific fields to provide multidisciplinary support. This suggestion was accepted and accordingly three firms of sub-consultants were appointed:

Town & Regional Planners	Responsible for determination of land ownership, registration of servitudes, and advisory support on social issues and local government structures.
NGO	Responsible for training and capacity building, and assistance with the development of local structures.
Accountants	Responsible for the development of financial systems for the payment and collection of revenue.

#### 4.1.3.3 The Limehill Complex Umbrella Water Committee (LCUWC)

None of the members of any of the Water Committees or of the LCUWC were elected in the conventional democratic sense. Members were appointed through the existing tribal structures. At that stage of the project the engineers decided that there would be no point in attempting to impose formal election procedures. This decision was taken after consultation with the LCUWC. It was agreed that it would have been difficult to implement and would almost certainly have been resisted. It was recognised that a local organisation responsible for water supply and the collection of revenue would have considerable power. This would be particularly so as the organisation would have to employ staff to carry out administrative, operation and maintenance functions in an area where job opportunities are very limited. The Committee itself also came to understand its powerful position and, as a self-protective measure, undertook to report regularly to the Amakhosi on progress and on any issues which might be contentious. The reporting requirements were noted in the minutes of the first meeting between the Amakhosi and the LCUWC. The approach had to be cautious and open in order to avoid threats to existing leadership structures and to prevent the development of jealousy and conflict.

A constitution for the Committee was drawn up in consultation with the members and with appropriately experienced professional legal assistance. It was intended that the LCUWC would ultimately be converted into the Limehill Complex Umbrella Development Trust. A Trust was deemed to be the most appropriate legal entity to operate as the first local authority.

#### 4.1.3.4 Training and Capacity Building

No detailed demographic study was carried out prior to the commencement of the project. Information gathered for the Development Study<sup>(20)</sup> however, indicated that the area is typical of other densely settled rural areas in KwaZulu-Natal with high proportions of people over the age of 50 and under the age of 18, and high levels of unemployment. Nevertheless it was found that many of the residents had been employed in the past and there was not an unreasonable shortage of skills and ability. However the level of understanding necessary both to accept the consequences of implementing a principle of payment for services, and to acquire the skills necessary to administer and maintain a local water supply was clearly inadequate. It was decided that it would be necessary therefore to implement a training scheme aimed at establishing local ownership of the scheme. The engineering staff of the TJSB wished to encourage the assumption of local responsibility. The staff running the existing water supply network were employed by KZDOW and were poorly managed and inefficient. In addition the mechanisms for the transfer of the staff would have been complicated and were likely to be resisted. This project had commenced before the TJSB had achieved legitimacy and acceptance as a sub-regional authority, and before it had formed a coherent policy around local government structures. The policy of local responsibility was determined largely by the technical personnel, assisted and informed by technical and planning consultants based on a perception by members of the project team that such a policy was inherently correct.

Under overall co-ordination by the consultants, an NGO was appointed to be responsible for training and capacity building. Training was through a series of formal workshops followed by routine monitoring and training in the workplace. Regular meetings were held with local Committees and with the LCUWC at which project issues were discussed and differences of opinion resolved. Initially the members of the LCUWC were cautious and reluctant to engage in confrontational discussions with the engineers when in disagreement with suggestions. It appeared that they tended to withdraw without comment in such situations.

After training and experience gained through detailed involvement in the project in the first six months or so, their understanding of negotiating procedures in a technical development environment, and their level and quality of participation improved dramatically. There was no qualified assessment or evaluation however, of their improved skills and knowledge. This was based purely on the personal perception of the engineers.

Formal training was divided into three parts aimed at the Water Committees in each town, the LCUWC, and the administration and operations staff. Training by the NGO was augmented by external courses where necessary. Training requirements were discussed with the LCUWC but were strongly influenced by NGO staff and by the engineers. A series of workshops comprised the following:

**Committee Skills**

Representation and democratic principles  
 Roles and duties of committee members  
 Constitution drafting and explanation

**Project Management**

Opening a bank account  
 Project positions and functions  
 Recruitment, selection and employment  
 Budgeting and reporting procedures

**Financial Management & Storekeeping**

Ordering and distribution of goods  
 Materials and tools registers  
 Bank reconciliation  
 Time and wage sheets  
 Budgets

Stock control  
 Basic cash book  
 Expenditure analysis  
 Payroll and payment of wages

The titles of the workshops were as follows:

1. Committee representation and examples of committee constitutions
2. Explanation of the scheme, planning and programming, communications and project costs
3. Draft committee constitution
4. Principles and standards of the scheme for water supply options and rules for connections.
5. Rules and regulations for employees, reporting procedures and finalisation of costs
6. Committee skills training
7. Project flow organograms, basic budgeting and roles of committees and employees
8. Presentation on legal structures with advantages and disadvantages
9. Revision and problem solving

Members of the LCUWC attended formal courses in Durban given by the Development Contact Network. Each course lasted one day and titles were as follows:

- ❖ Mobilising community participation
- ❖ Democratic organisation
- ❖ Planning and goal setting
- ❖ Management and monitoring skills
- ❖ Basic bookkeeping
- ❖ Creative fund raising
- ❖ Funding proposals
- ❖ Legal frameworks
- ❖ Human resources
- ❖ Detailed budgeting

Selected administration staff attended training sessions given over a period of one week on the financial and administrative management of operations using the systems developed by the firm of accountants specifically for the project.

Formal training given is summarised as follows:

<b>Title</b>	<b>Description</b>	<b>Remarks</b>
LCUWC (16 people)	Training Workshops in the functioning of a Committee	10 Workshops with distribution of explanatory documents
Water Committees (6 No. with 10 people in each)	Training Workshops on specific duties and responsibilities	10 Workshops for each Committee
LCUWC Leadership Skills	10 days in the classroom	Discussion and instruction in duties, responsibilities and methods of application
Financial Systems	5 days in the classroom	Instruction detailed application of systems designed for the project
Steering Committee Meetings	Monthly meetings	Formal meetings attended by LCUWC members and representatives of all interested parties

**Table 2      Formal Training**

The balance of the training was largely technical and was given on site in construction and maintenance methods and through regular routine monitoring and checking.

In order to ensure effective use of funds within a fixed budget, it was essential that the activities of each part of the professional team of engineers was co-ordinated and that each member of the team had a clear understanding of the roles and progress of the other members. Accordingly during critical periods in the project, co-ordination meetings were held weekly. Otherwise routine meetings were held once a month.

The Committee, supported by the engineers and the NGO, agreed that the training and the experience gained by committee members and employees during the construction stage would not be sufficient to ensure effective administration and operation and maintenance, or to deal with potential political problems. All participants agreed that further training would be necessary. Since the project budget for training was limited, application was made to the Mvula Trust for further funds for specific formal training. Funds were granted directly to the community and it was agreed that further training activities would be administered by the LCUWC, subject to the requirement by the Trust that expenditure and training be monitored and reported by the NGO. Due to the later disbanding of the LCUWC the funds from Mvula Trust have not been used.

The work done by the committees and employees after commissioning of the first stage of the scheme showed that the training and capacity building had been reasonably successful. Further progress was expected as experience was gained in daily operations. Deficiencies which were apparent to the engineering team included:

- a reluctance to assume authority and responsibility at senior level
- a lack of appreciation of the importance of communications both within the Committees themselves and from the Committees to the community
- some inappropriate allocations of paid positions to committee members
- unrealistic expectations of the job opportunities and financial rewards available

The engineering team decided that technical support and financial monitoring would be given until such time as local leadership and skills were fully developed. This assistance was given by the consultants during the course of the project and by TJSB/Regional Council staff after completion.

#### 4.1.3.5 Organisational Structure

The general organisational structure established by the professional team at the start of the project was adopted with minor modifications (Figures 3 and 4). This model was used to develop the detailed organisations for operation and maintenance of the scheme. Organograms were produced for each of the seven towns. In addition separate organograms were produced for the construction stages in each town (Figure 5). The structures were intended to be flexible and could be shaped to suit changing circumstances. In many ways they are not very different from established municipal structures with the exception that provision is made for continued support from the regional authority.

An important function of the organisations was communications. This proved to be difficult to carry out and even more difficult to monitor. The first level of communication between the professional team and the Committees was achieved through regular meetings. The second level of communication between the Committees and the public was more of a problem. For the scheme to be a success it was vital that the community understood clearly the objectives of the scheme and accepted the underlying principle of payment for services. Communication was possible in a number of ways:

- ☞ through personal contact and word of mouth
- ☞ at public meetings
- ☞ through the distribution of leaflets and advertising material
- ☞ through schools and school children
- ☞ through mass communications media such as radio, newspapers and television

All of these were used with varying degrees of success. The population of the area had expanded considerably in the last few years through in-migration. It appeared therefore that there was a lack of social networking which could have facilitated communication by word of mouth. There was no way of assessing the quality of communication except at public meetings. These showed that most residents had an imperfect understanding of the scheme even after the communications efforts made by the engineers. People were easily swayed by aggressive elements of the community many of whom had a vested interest in rejecting the primary principle of payment in that they had built up small businesses installing house connections from the old reticulation network.



# CONSTRUCTION SYSTEMS

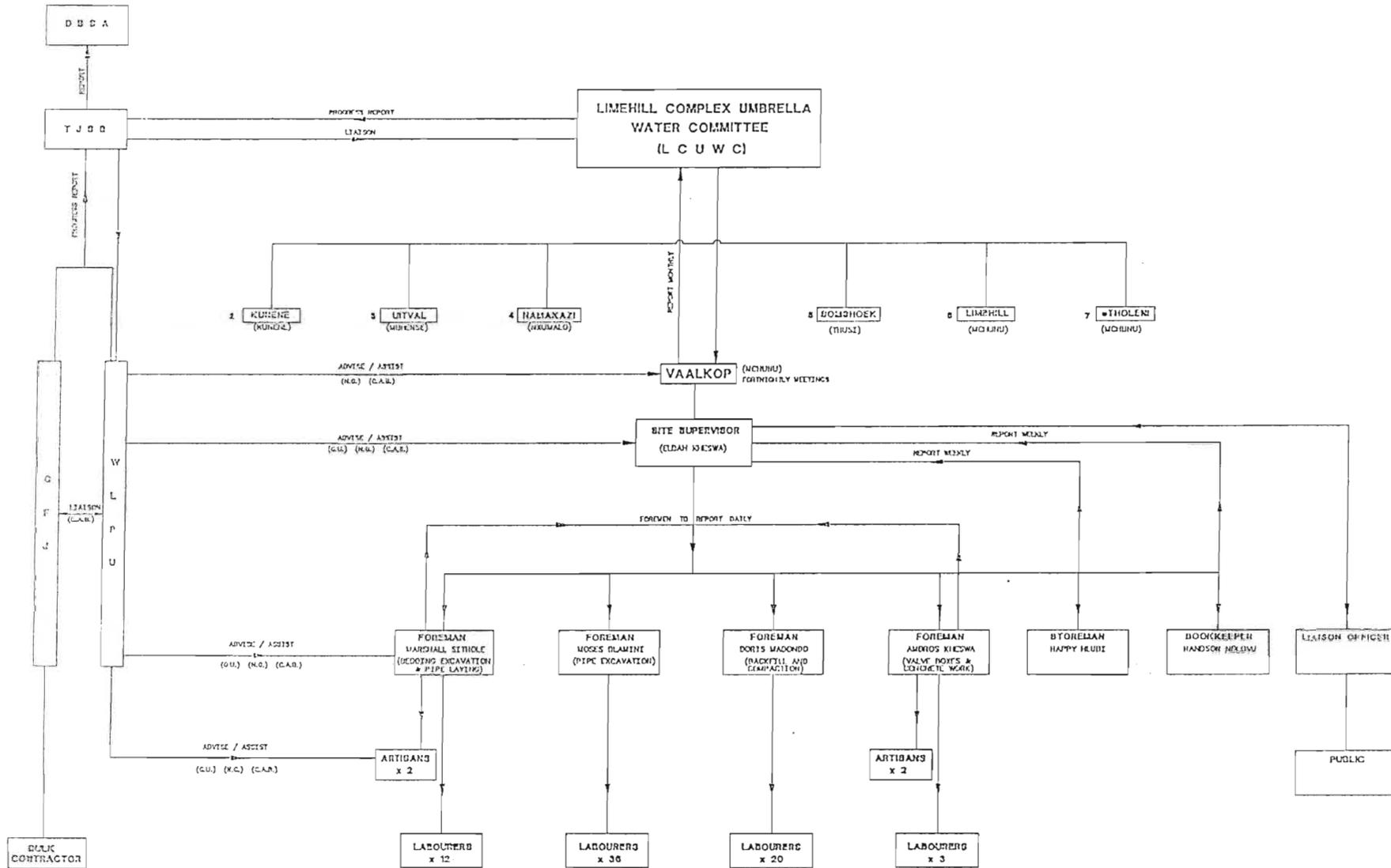


Figure 5

The rules of the scheme were explained in detail and individually to each person making application for a water supply. These rules included provision for exclusion (disconnection) if a water account was not paid.

The consultants and some senior staff in the TJSB had stressed that the successful implementation of the scheme could take a considerable time as people learnt and accepted operational procedures. Experience by the consulting engineers in similar projects suggested that a considerable degree of patience and understanding was necessary. Unfortunately the staff of the funding agency (DBSA) and other senior staff in the TJSB were reluctant to accept that provision would have to be made for extending support systems for a period which could not be defined, largely on the grounds of the possible cost implications.

#### ***4.1.4 System Design***

Preliminary design of the network was carried out in 1993 before the implementation of the RDP and before national standards under this programme had been established. However the design standards adopted did not differ significantly from the RDP standards. Initially allowance was made for street standpipes within 100 metres of every household and a supply of 25ℓ per capita per day with pipe diameters sufficient for a supply of 50ℓ/c/d.

In detailed discussions with the LCUWC on supply options and cost recovery methods it was suggested by local residents that the majority of people could afford and would wish to have house connections. The design of the system was altered to remove the provision of street standpipes and to allow for house connections only. Connections would be installed on application and after payment of a connection fee which could be paid over three months.

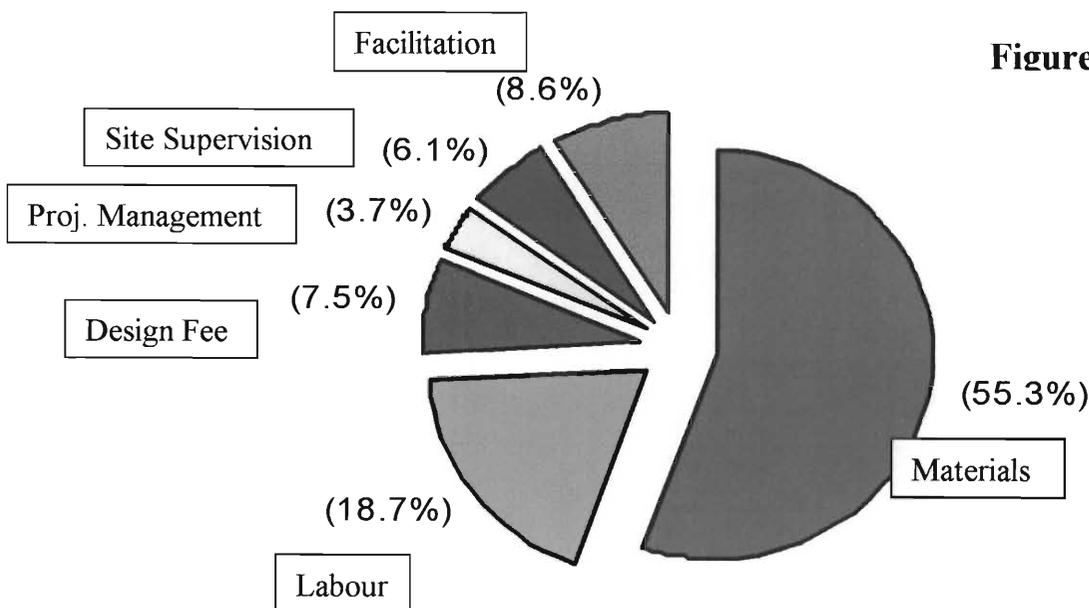
It was agreed that the system would have to be designed to accommodate those who could not afford house connections. The regulations were devised to include a condition that those who obtained a house connection would have to allow those who could not afford a connection to purchase water from them. Those without a connection would purchase coupons from the Committee office. These would be used as payment to obtain water from residents with connections. These residents would

in turn return the coupons when they paid their water account and their value would be credited to the account. The cost of the coupons and their redemption value were slightly higher than the cost of metered water. This was to allow for spillage and to give suppliers an incentive not to withhold supplies and to accept the intrusion and nuisance of people coming onto their premises to purchase water. The unfortunate corollary to this system was that those who could least afford to pay for water would have to pay a higher price than those who were more affluent and could afford a connection of their own.

A manual system for meter reading, billing, financial control, stores control and maintenance was designed. Staff members at various levels of seniority were trained in elements of the system appropriate for their position. The system was designed to take account of specific local conditions and could be adjusted and computerised quite easily in the future.

**4.1.5 Costs**

The estimated cost of the reticulation scheme was R5.7 million inclusive of construction, engineering fees, supervision, training and institutional development. This estimate was prepared in 1993 and while some allowance was made for escalation, delays in the start of the project to early 1995, and delays which occurred at the end of 1995 due to local social problems, led to the budgeted allowances for project management, disbursements, supervision, committee meetings and training being exceeded. A breakdown of the budget is shown in Figure 6 below.



**Figure 6**

**LIMEHILL COMPLEX WATER RETICULATION**  
 COMPARISON OF ENGINEERING, SOCIAL & CONSTRUCTION COSTS

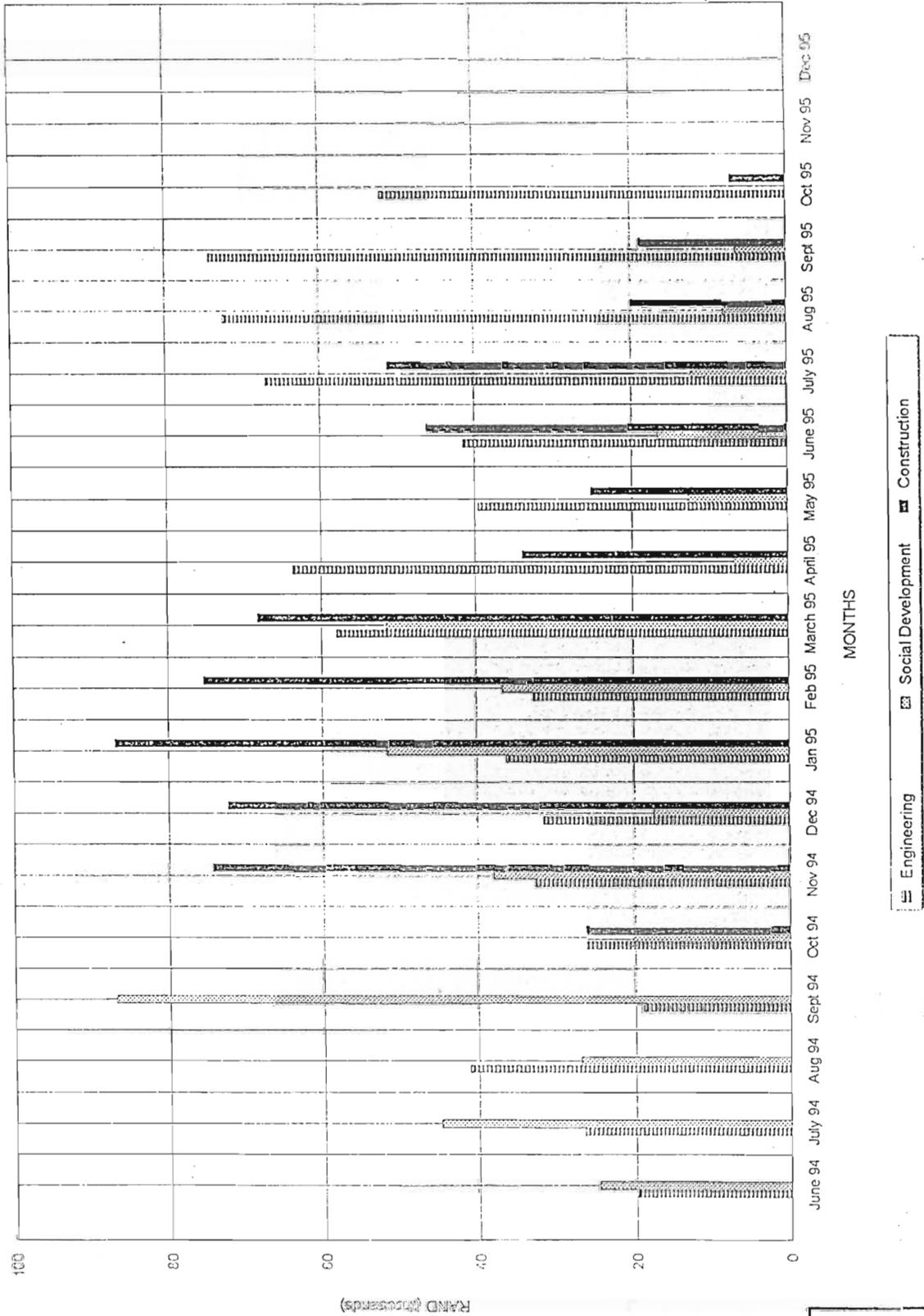


Figure 7

The chart on Figure 7 shows comparisons between the amounts spent to the end of 1995 on construction, engineering and social issues. "Social issues" were assumed by the engineers to include training, committee meetings, planning of organisational structures, and communications. The amount spent on dealing with social issues had not been allowed for separately in the original budget. Funds were allocated from contingency sums conventionally allowed in civil engineering projects as a percentage of the estimated construction cost. It is difficult to estimate the cost of this important element of a project for the provision of services, as it is highly dependent on local community capacity and local acceptance of the scheme. These are issues that are not predictable in the same way as technical problems such as ground conditions and variations in design parameters, and certainly are less easily understood and accepted.

#### **4.1.6 Progress**

Construction work in the first town, Vaalkop, was completed on schedule by mid-1995. The first stages of the programme for training and capacity building and the design and development of operation and maintenance systems were completed during 1995. However when residents were requested to make applications for connections which included the payment of a deposit, vociferous objections were raised by people who resided in a part of the town which had had the benefit of free water from the old network which was being replaced by the new system. Even though this reaction had been predicted at the start of the project, most of the engineers were surprised that the efforts made towards obtaining community acceptance and approval proved to be so unsuccessful.

There followed a period of about three months when intensive discussions were held at various levels involving the professional team, the DBSA, the LCUWC, the Amakhosi, and the Vaalkop Induna, and at public meetings in attempts to resolve an issue which had the potential to degenerate into serious conflict. This process was interesting in that it revealed that in spite of the attempts to communicate and define roles, there were significant differences in understanding among all parties. These included serious differences of interpretation of system design intentions even among the engineers in the project team. Interesting also was the approach adopted by the Amakhosi which was effectively not to take a definitive stance on any contentious issue. They were prepared to allow discussions between the objectors and the project authorities to continue apparently indefinitely. This did not suit the representatives of the funding agency or some elements of the supply authority, who were strongly conscious of possibly ambiguous terms of the loan agreement, the need to generate a

cash flow which would assist with loan repayments, a need to establish set procedures which could be replicated in the other six towns, and the elimination of delays which could result in the loss of economies of scale. In other words the project was driven by the conventional constraints of programme and budget with tension between the perceived requirement for local government to deliver services and socially defined parameters.

The outcome of this dispute was that at the end of 1995, the uThukela Regional Council, pressed by the DBSA, suspended the whole project and entered into a process of system review. This process continued intermittently throughout 1996. Finally a decision was taken by the TJSB to withdraw the responsibilities which were to be delegated to the LCUWC, and to transfer responsibility for operation and maintenance to the Water Services division of the TJSB. The design standards were reviewed and revised to a lower level which did not allow for future expansion and upgrading. The approach to construction was revised from one where local organisations were entirely responsible for construction but were issued with tools and materials obtained under separate contracts, to one where the contract for each town was awarded to a conventional contractor with specific contractual conditions for labour intensive methods using local labour.

The objectives of the project therefore were revised so that the only significant local benefit would be an improved supply of potable water and local employment in construction. The more intangible benefits of local responsibility and empowerment were discarded, at least as a corollary of the project though not necessarily as a long term objective of the TJSB which at about this time became the uThukela Regional Council.

The construction of the bulk water supply and reticulation networks resumed in 1997 and the project was substantially completed by mid-1998. House connections to applicants continue and the system for disconnection for non-payment is being applied effectively. Financially the scheme is still not self-sustaining. Consumption levels are lower than predicted and house connections have not been installed by the Council as fast as was planned. The low consumption levels may be a result of low income households matching costs to affordability as has happened elsewhere in KwaZulu-Natal.

## 4.2 Ekuvukeni

### 4.2.1 Background

Ekuvukeni is a proclaimed town established in 1969 initially to accommodate people forcibly removed from smallholdings and white farms near Wasbank about 20 kilometres to the north, and later from elsewhere in the province. It is situated about 40 kilometres east of Ladysmith which is the nearest town with any significant commercial or industrial development (Figures 1 and 2). Ekuvukeni is the largest and the only proclaimed town in the Limehill Complex which includes seven smaller dense or medium-dense settlements. Some of these were also established under the forced removals programme, Limehill being the most well known after featuring prominently in the international press in the 1960s.

Ekuvukeni has 2749 sites and an estimated population of between 15 000 and 20 000. While the communities in Ekuvukeni and the other smaller settlements may not be classified strictly as rural, they exist in a rural context with limited opportunities for income generation outside of government employment or agriculture.<sup>(21)</sup> Much of the income for people in the town is remitted from family members with jobs elsewhere. This is a scenario typical of many rural communities.<sup>(20)</sup>

Services in Ekuvukeni consisted of basic gravel roads, street standpipes for potable water supply, bucket latrines, and refusal removal. Payment for these services to date has been nominal and not strictly enforced and the services are poorly maintained. Residents are able to purchase stands under Deed of Grant at very low prices and many people have elected to do so. The quality of housing varies randomly from high quality brick-under-tile to wattle and daub. The town was administered originally by the Department of Bantu Administration. Responsibility passed successively to the Department of Development Aid (DDA), the KwaZulu Departments of Works (KZDOW) and Interior, and the KwaZulu-Natal Provincial Administration Department of Local Government & Housing (LG&H), up to the present when responsibility rests with the uThukela Regional Council.

#### **4.2.2 Development History**

The establishment of the town and occupation by the first residents in the 1960s, was accompanied by promises of major industrial development and employment opportunities in the area. The drawings showing the layout of the planned development were seen by the author in 1986 but now seem to have disappeared. As in similar towns established under the forced removals programme, these promised developments never materialised. In 1986 the KwaZulu departments of Works and Interior took over responsibility for operation and maintenance and for administration respectively although there was still some involvement by the Department of Development Aid. As with the other towns of the Limehill Complex, the organisational structure was vertical and there was very little co-ordination between line function departments.

#### **4.2.3 Upgrading Project 1986-1990**

No further attention was paid to the town as far as development was concerned until the mid-1980s when in 1985 and 1986 consulting engineers were appointed to carry out investigations into the upgrading of services in the town. Interestingly separate appointments were made to two firms of consulting engineers within about nine months of each other by KZDOW and DDA respectively, resulting in two investigations and two reports!

The consultants whose report resulted in the acceptance of upgrading recommendations, also carried out a survey to assess public opinion and with the objectives described in the following extracts from the report prepared by the consultants <sup>(30)</sup>:

⇒ *to determine whether the residents see the town as permanent place of residence and that the town therefore serves a viable long term function.*

There would be little point in improving the services in the town if the investment by the residents was small and if, with the possibility of socio-political development leading to increased population mobility, the majority of the residents would move to other areas. ....this is particularly pertinent against the background of the population relocation which brought Ekuvukeni into being.

⇒ *to determine the form of town administration both official and unofficial.*

This is necessary so that the competence of the official administration to look after a more sophisticated level of services can be gauged and to determine the level of acceptance by the residents of the official administration. At an unofficial level the degree of community involvement in matters such as care of the elderly and disadvantaged, crèches, youth programmes, parks, and general recreation should be known so that services improvement can be carried out with maximum community participation.

⇒ *to establish as far as possible the range of income levels, income sources, employment levels and standards of living of the town residents and obtain some idea of their ability and desire to contribute towards the costs of improved services.*

It is anticipated that some means of charging for the improved services will be implemented. In addition the installation of sanitary fittings to suit the improved main services will incur some cost to each household. It is therefore essential to have some knowledge of the disposable incomes and the expectations of the residents in order to formulate the most suitable solution.

⇒ *to examine the opinion of the residents regarding the extent and quality of existing services in the town and to identify development priorities in general.*

The relief of specific grievances is essential to the successful community participation in the improvement of services. It is therefore necessary to identify such grievances if any. The mere provision of some upgraded services to whatever degree need not be the top priority.

The motivation for a survey was accepted by the client (KZDOW) and a random street survey was carried out over two separate periods of two days each in November 1986. The consulting engineers obtained advice from and were assisted in this initiative by the Human Sciences Research Council. Interviews were conducted with individuals and groups in twenty-nine households only. The (qualitative) data was interpreted by the engineers leading to the following conclusions <sup>(30)</sup>:

“The town is a viable entity and upgrading and improvement would be worthwhile.

Some means of encouraging increased local employment opportunity requires immediate and urgent attention.

A policy to determine whether and how the costs of improving main services are to be recovered must be established. Such a policy would also lay down whether the costs for the installation of household facilities corresponding to the main services are to be borne entirely by the occupant or whether a degree of subsidisation is to be adopted.

The options available to the householder, with particular reference to costs, should then be clearly presented to the residents of Ekuvukeni for their consideration. Once their reaction has been assessed a final decision on the methods of supply can be made.”

The investigation did not realise the objective of prioritising needs nor did it in any way quantify affordability levels.

The Preliminary Investigation Report was submitted in January 1987 and was considered by the various client bodies comprising the Kwazulu Department of Works, the Department of Development Aid and the Development Bank of Southern Africa. Following further discussions with specific reference to the initial proposal to provide waterborne sanitation and house water connections, a supplementary report was prepared by the consulting engineers including final recommendations and cost estimates. This report provided for pit latrines and street standpipes, largely at the instigation of the DBSA. The report was approved and led to the granting of loan funds from the DBSA to the KwaZulu Government under specific conditions for the upgrading of services.

The upgrading project commenced in 1988 and included the following:

**Water**

Completion of the water reticulation network

Improvement of existing street standpipes

Provision of additional street standpipes

Allowance for metered house connections

## **Sewerage**

Replacement of bucket latrines by VIP latrines

Allowance for septic tanks (resident to cover costs of on-site installations)

Provision of public toilets in the business area

## **Roads and Stormwater**

Surfacing of the main bus route and business area service road

Upgrading of all local streets

Upgrading of the stormwater drainage system

Provision of a bus shelter at the business area

There was no consultation with residents or with locally based administration officials on any of the decisions taken for the proposed upgrading programme. The technical team agreed however that <sup>(32)</sup>:

“Community participation in the project will be encouraged.”

and also that

“The establishment of a local authority for Ekuvukeni is very important.”

and

“...local contractors will be identified for specific tasks.”.

These were purely subjective opinions based on the perceptions of the consulting engineers of what could and should be done to improve the town and hence the quality of life of the residents.

The project was carried out under the direction of the consulting engineers appointed as Project Managers using labour intensive methods of construction and local contractors where appropriate. There was no specific appointment of a project facilitator or liaison officer. The responsibility for community liaison was borne by the Township Manager. At that time there did not appear to be any formal community based organisations which were recognised by the administration.

The water reticulation, roads and stormwater portions of the construction stage of the project were completed successfully using labour intensive methods devised and instituted by the engineers. Local labour was recruited through the Township Manager and worked on a task based system. The project did not allow specifically for training or capacity building but these were given some attention during the construction process. It was found that there were a considerable number of people in the town with experience in the construction industry who could be employed without the need for training and who contributed significantly to the high quality of the completed works.

The sewerage portion of the project which required the replacement of bucket latrines with pit latrines was not successful. While it was acknowledged by the authorities that the bucket latrine system was unacceptable from a user satisfaction point of view, the authorities' greatest motivation for its replacement was the high cost of operation and maintenance and the labour intensive nature of the operation. This required large numbers of staff who had to be managed from departmental offices in Ezakheni about 40 km. away. These offices had similar responsibilities for a number of other towns and did not have sufficient qualified personnel.

The construction of pit latrines on occupied residential sites requires a high level of co-operation by householders. The alternative of a septic tank for people who could afford it was also compulsory under the scheme on health and technical grounds for any householder who required a house water connection to ensure that 'grey' water would be disposed of effectively on site. The cost of the septic tank and toilet facilities would have had to be borne by the householder.

The lack of community based organisations, the dictatorial position of the township management, the absence of any formalised community liaison mechanisms leading to the consequent lack of knowledge of community needs and aspirations, and the technical approach to the project made it difficult for the engineers to establish any form of constructive engagement with the community around sanitation issues. Random discussions with individuals in the town however, suggested that there was considerable dissatisfaction among residents with the proposal to construct pit latrines and with compulsory requirement for those with water connections to install septic tanks at the owners' cost. The likelihood of strong objections to pit latrines meant that their construction could not have been enforced by the engineers. Interestingly the objections were supported by the Township Manager on administrative and technical grounds. The responsibility for working with householders for the actual construction of pit latrines on each site would have had to have been done through the

Township Manager and the potential for conflict was high. The Township Manager was also uncertain as to the long term responsibility for maintenance of the pit latrines.

After discussions with the Township Manager a public meeting was arranged <sup>(31)</sup>:

“...at which the Project Managers could explain the development objectives and at which residents could give their views on the proposed development.”

The meeting was attended by about 1000 people. This was the first and only community meeting held to discuss project issues.

While the upgrading of the water reticulation network, roads and stormwater drainage (already substantially complete) was approved by those attending the meeting, the only support for pit latrines came from the sister at the clinic on the grounds that they would be an improvement from a health point of view. The residents were aware that waterborne sanitation had been installed in some sections of Ezakheni, a township outside Ladysmith, and in some sections of Mondlo outside Vryheid. Charges for these services were known to be nominal. The general point of view expressed was that “the government put us here, therefore the government can provide better facilities” and “if they can have them why can't we?” The consensus at the meeting was that if the government could not afford to install waterborne sanitation at present then the residents were quite happy to live with the bucket system until the government did have enough money.

The issue was discussed at some length by the project team consisting of the client, the funding agency and the consulting engineers. The client did not have sufficient capacity in the administration to deal constructively and effectively with the objections that were likely to arise and eventually took the decision to omit the sanitation upgrade from the project.

It is worth noting that in the first Preliminary Investigation Report <sup>(30)</sup> the installation of waterborne sanitation was recommended by the consulting engineers. This recommendation was based largely on technical grounds. Firstly in many parts of the town there would have been significant geotechnical problems in the construction of pit latrines. Secondly it was anticipated that many households would apply for house water connections and a system was required which would dispose effectively of grey water. The recommendations acknowledged amongst other things, that residents would require some

assistance with the provision of household facilities as noted in the following extract from the report (30).

*“The provision of safe community water supply and sanitary disposal of excreta are the most effective and permanent technologies for improving the health of populations in developing countries. Although these basic sanitary measures do not in themselves ensure economic development, they constitute the basic necessary infrastructure without which other development will be hampered.*

*It is strongly felt that only by the recognition of sewage disposal and water supply more as basic infrastructural elements of development and less as social services will the necessary priorities be accorded them in national development programmes. Such priorities must form the basis for investment.”*

The above quotations from publications by two international development agencies indicate the importance attached to the improvement of sewerage and water supply facilities.

It would be unrealistic to expect small and relatively poor communities to cover the full cost of such improvements. Subsidies are an acceptable criterion for investment and can be adopted with provisions for varying the level of subsidisation in accordance with community economic growth.

Water supply and sewage are closely interrelated and the provision of both services is necessary for effective improvement of social benefits. Where water supply alone is provided environmental conditions will deteriorate due to the accumulation of wastes in yards, drains, low-lying areas and watercourses.

.....it is recommended that improved facilities to the extent that each house or stand would have its own connection to the water main should be installed. Accordingly the sewage collection and disposal system to be adopted must be one which can accommodate all the household waste generated.”

#### ***4.2.4 Water and Sanitation Project 1992-1998***

Following the abandonment of the sanitation part of the upgrading project carried out between 1986 and 1990, the Department of Works was still under pressure to replace the bucket latrines at Ekuvukeni with a more acceptable system. This was still due to the high costs of operation and the high levels of personnel management required, and to a lesser extent due to pressure from the community which did not have an effective voice. In 1992 the Department managed to allocate funds from its annual budget for the design of a sewer reticulation network and a new sewage treatment works for the town. The work was carried out as a purely technical process with some interruptions due to fluctuations in the availability of funds for engineering fees. The bulk of the design work was completed in 1995.

By 1995 there had been considerable changes in the background against which development in towns such as Ekuvukeni had to be carried out. The elections in 1994 had resulted in a new government which had new priorities, an entirely different approach to development, and was committed to redressing the injustices which the majority of the population had suffered under past dispensations. The KwaZulu government departments which had been responsible most recently for Ekuvukeni were amalgamated with the Natal departments previously responsible only for white areas. The final major change was the availability of finance for infrastructure development available through the Reconstruction and Development Programme and the availability of funds for housing through the subsidy schemes administered by the National and Provincial Housing Development Boards.

In 1996 application was made to the RDP for funds for the sewer reticulation and a new sewage treatment works for Ekuvukeni. The Business Plan prepared for this application included a social compact with an organisation known as the Ekuvukeni Local Development Committee (ELDC). This body had grown out of a statutory body formed in about 1993 called the Proper Authority. Also in 1996, although through a different government department and without any co-ordination, planning consultants were appointed to prepare an Integrated Development Framework (IDF) for Ekuvukeni. The planning consultants engaged in a process of community consultation as part of the planning process and gave professional advice and assistance which led to the formation of the ELDC.

At the time of the submission of the Business Plan, the sanitation project designed to provide waterborne sanitation was still a proposal devised by the consulting engineers appointed by the government department responsible for the operation and maintenance of services in the town. The social compact with the ELDC was obtained after one brief meeting. It was not the result of any negotiated process in which the sanitation options and the consequences of selection could be discussed in any depth. Nevertheless the Business Plan did identify the requirement for detailed community consultation and involvement in the project and for a programme leading to acceptance by the residents of the principle of payment by consumers of charges sufficient to cover the costs of operation and maintenance. Even so the Business Plan was written entirely by the consulting engineers.

The funds for the sanitation project were approved by the RDP in August 1996. The RDP provided R7.3 million and the Department of Local Government and Housing provided the estimated balance of R6.0 million giving a total project value of R13.3 million for sewer reticulation and a new sewage treatment works. All funding was for the construction of capital works and there was no requirement for the recovery of the capital costs through user charges. There were conditions imposed by the RDP however, which included a requirement that future operation and maintenance costs would be covered by consumer charges, and that the RDP funds would be spent by the end of September 1997. The final date for the expenditure of RDP funds was subsequently extended to the end of December 1997.

Only once funds for the project were approved was consideration given to the detailed implementation of the project. The appointment of the consulting engineers was extended to allow for a more all-embracing role as Project Managers. It was suggested by the consultants and accepted by the Department of Local Government and Housing that the project should form the basis for a long term programme for community participation in town management and development. It was recognised that the decision to proceed with the project had been taken based on the perceptions of the authorities and their consultants that improvements to water and sanitation in the town were priorities in the hierarchy of needs of the residents. It was recognised also that the commitment of funds to the project by the RDP, on the condition that they were spent within a specified period, would result in pressures firstly to proceed with the project on the assumption that water and sanitation were indeed priorities, and secondly to carry out construction within a that period.

The first step taken by the Project Managers therefore was to initiate a programme of community consultation and to set up a Project Steering Committee (PSC) made up of representatives of all interested and affected parties. The first meetings were held in September 1996.

The Project Managers had divided the project into distinct primary elements each of which had various subsidiary secondary elements:

- Sewer Reticulation
  - Sewer Construction – Labour intensive methods*
  - Sewer connections*
- Sewage Treatment Works Upgrade
  - Construction*
  - Operation and maintenance cost recovery*
- Water Connections to Households
  - Installation costs*
  - Operation and maintenance cost recovery*
- Organisational Structures & Cost Recovery Systems
  - Local government systems and administrative structures*
  - Capacity building and training*
  - Affordability and willingness to pay*
  - Communications*
- Costs
  - Project costs*
  - Cost monitoring*
- Housing Subsidy Scheme
  - Connections and construction of toilets*
  - Housing*
- Operation & Maintenance

The consulting engineers recognised that expertise in fields outside of engineering would be necessary. Firstly the previous services upgrading project had not been entirely successful for reasons which were not related solely to technical issues. Secondly it was essential to ensure that the investment of a significant amount of public money would be carried out effectively and with due

recognition of the long term overall objectives of the project which were greater than the mere provision of services. Thirdly, the complex provincial, regional and local political and social dynamics suggested that particular expertise would be required.

Accordingly, while the consulting engineers retained responsibility for overall project management, specialist sub-consultants were appointed as follows:

### ① Planners

The planning firm which had been responsible for the IDF, also had appropriate experience in local government and in the facilitation of community participation in development. This firm was appointed to work closely with the various government departments responsible for administration, planning, and operation and maintenance in the negotiation of appropriate local government options, to identify and manage capacity building and training requirements, and to establish and work with local committees on purely project related issues.

### ② Social Consultants

The success of the water and sanitation project would rely on general community acceptance of the objectives, and full community participation in the implementation and operation phases. Unfortunately little was known of community structures and social relations in the town on which a strategy for such acceptance and participation could be based. Preparatory research was required therefore to provide an initial base line of information on community understanding of the project. This research included addressing issues such as understanding of project objectives, job opportunities, cost recovery, affordability levels, payment systems, town administration and the future structures of local government. The first phase of this research included a literature review, interviews with key informants and focus groups, and a stratified sample survey using a structured questionnaire. The research was conducted at the end of 1996 and a report was produced early in 1997 <sup>(23)</sup>. Although it was desirable to continue into a second phase during construction and after completion to formally monitor and evaluate social issues, it is unlikely that there will be sufficient funds available.

### ③ Communications Consultants

Communications at all levels as a dialogue between all the parties involved in the project was seen as vital component for its successful conclusion. There is no formal system of

communications in the town at present. As a result it became clear during the initial meetings at the start of the project that there were misunderstandings of project objectives between sectors of the community and between the community representatives and the development agencies. Accordingly the consulting engineers were requested to present proposals on a communications strategy for consideration by the Project Steering Committee. The engineers discussed the issue with specialist consultants and proposals were presented which allowed for communications through the establishment of representative ward committees, presentations at schools, and a project newspaper. It was agreed that the publication of the newspaper would be controlled by the specialist consultants in consultation with a community-based sub-committee.

Initially the PSC was given responsibilities which were wider than the consideration purely of project issues and related to long term development and local government strategies. The local authority (DLGH) however lacked capacity and found it difficult to engage meaningfully in the Steering Committee on political and socio-economic issues. It was agreed therefore that the Steering Committee should confine its activities to the sanitation project at least until policies for local government had been clarified at provincial level. The project would be managed however in the context of long term development.

The research carried out by the social consultants provided essential information to guide both overall development in general and the sanitation project in particular. A copy of the conclusions of the report produced by the consultants is contained in Annexure A<sup>(23)</sup>. Extracts from the conclusions of the report are as follows:

- ➡ Ekevukeni has a stable population of low and very low income households.
- ➡ The community is committed to replacing the bucket latrine system with waterborne sanitation.
- ➡ The town has various institutions of governance in which the community has varying degrees of confidence.
- ➡ The commitment to waterborne sanitation translates into a willingness to pay for operational costs
- ➡ Willingness to pay depends on affordability
- ➡ Estimates made by households of the amount which they would be prepared to pay are made without any experience of the real costs of the system both inside and outside the home.

EKUVUKENI WATER AND SANITATION PROJECT  
ADMINISTRATION STRUCTURE

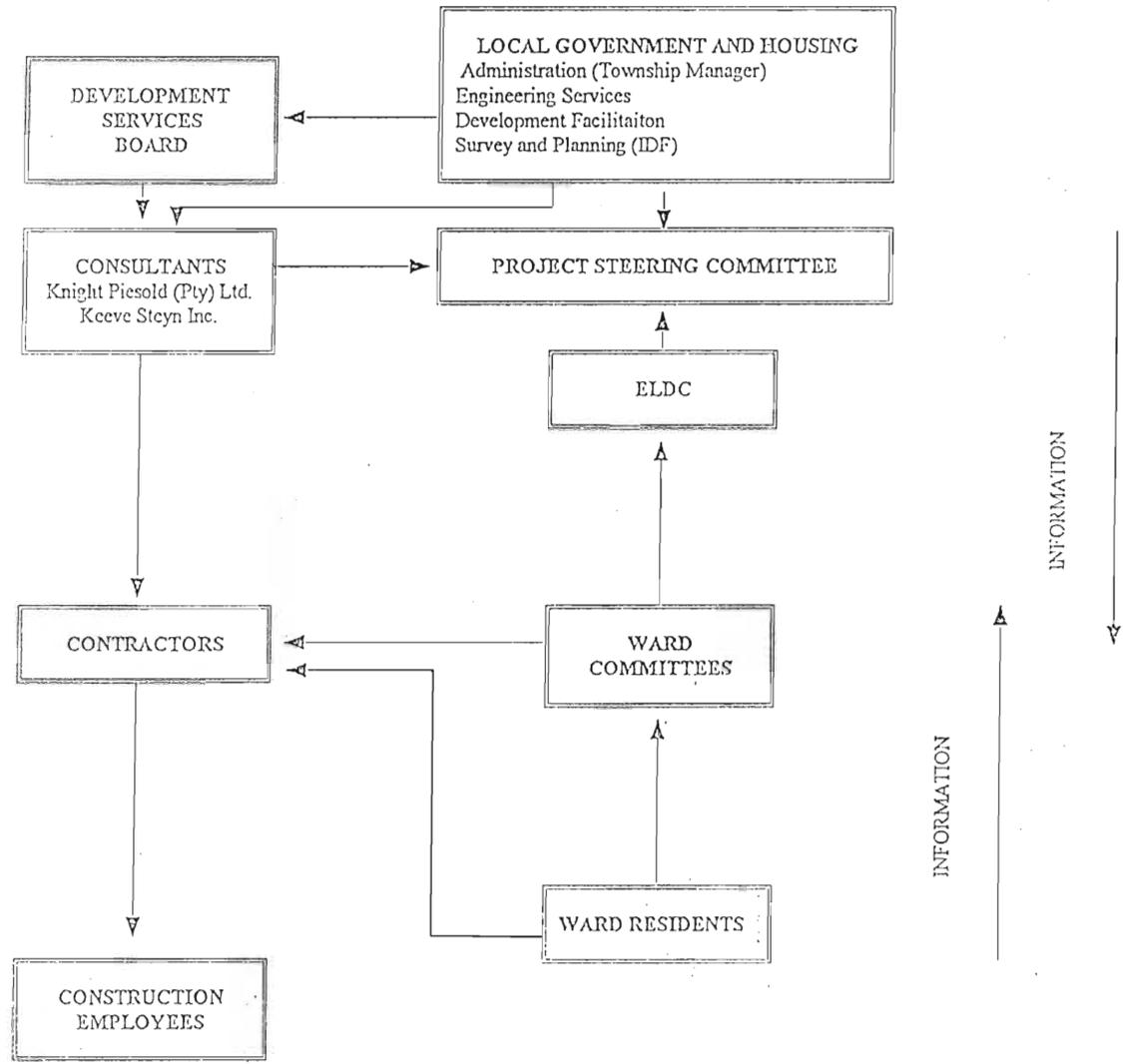


Figure 8

- ➡ The tariffs for water and sanitation should take into account three factors: household income, the costs of all essential public services, and private system maintenance costs.
- ➡ A strategy must be negotiated to provide for the water and sanitation needs of those who cannot afford waterborne sanitation.
- ➡ Management of the system must be seen to be effective and those responsible must be acceptable to the community.

The early meetings of the PSC from September 1996 up to March 1997 dealt largely with project implementation strategies with due consideration of the recommendations emanating from the social research. An organogram of the project team is shown in Figure 8.

The town is divided up into eight wards. The ELDC comprised one representative from each ward who reported to a ward committee. Each of the ward committees, entitled Watsan Committees, was given training on committee formation and their functions and responsibilities on the project. The ELDC was also given formal training at a higher level on conflict resolution and mediation and on communications and reporting. The professional team employed a full time facilitator on site before and during construction, and the ELDC appointed a Project Liaison Officer (PLO) who was paid. This was the only community representative who was paid for his or her services. The government administration refused to allow payments to committee members on the grounds that it may set a precedent for future local government structures and thereby affect the financial viability of the town. The policy is somewhat different in other development projects funded through the RDP where committee members are paid for attendance at formal PSC meetings. The result was an unfortunate reduction in attendance levels by committee members as the project progressed.

As expected the social and political issues were the most difficult to negotiate and resolve. There were strained relationships at times between the ELDC and the local township administration over authority, power and responsibility. Both parties, possibly for different reasons, appeared to wish to be seen to be in control and to gain credit for development successes while distancing themselves from development problems and failures. The question of payment for services was publicised extensively but the process is not complete. The issue will only be workshopped in detail with committees when tariff proposals have been accepted by the Regional Council. It will be interesting to note then the stance taken by the local administration and the ELDC respectively when this potentially contentious issue is presented for discussion and approval by the community.

Party politics do not appear to have played a significant part in the project implementation. While different party allegiances were recognised, they were not used to further political ambitions through the dramatisation of conflicting opinions in committee discussions or in more public forums.

The technical parts of the project were handled with a considerable degree of innovation. It was agreed at the early PSC meetings that every effort should be made to involve the community in construction. The consulting engineers devised tender documentation that would allow inexperienced contractors to tender for sewer construction work. Tender documents, which were approved by the KwaZulu-Natal Tender Board, were prepared separately for the supply of labour and for the supply of materials and excluded conventional requirements for sureties and insurance. These are usually provided by a bank or an insurance company but are only available to contractors with an acceptable (low risk) credit rating. Emerging contractors are rarely in a position to comply with requirements. Eight labour contracts were advertised for tender, one for each of the eight wards. The traditional site inspection was held early in the tender period and was followed by two weeks of workshops to which all tenderers were invited although attendance was not compulsory. At the workshops the conditions of contract and specifications were discussed and explained in detail, as were methods of pricing each of the items in the schedule of quantities.

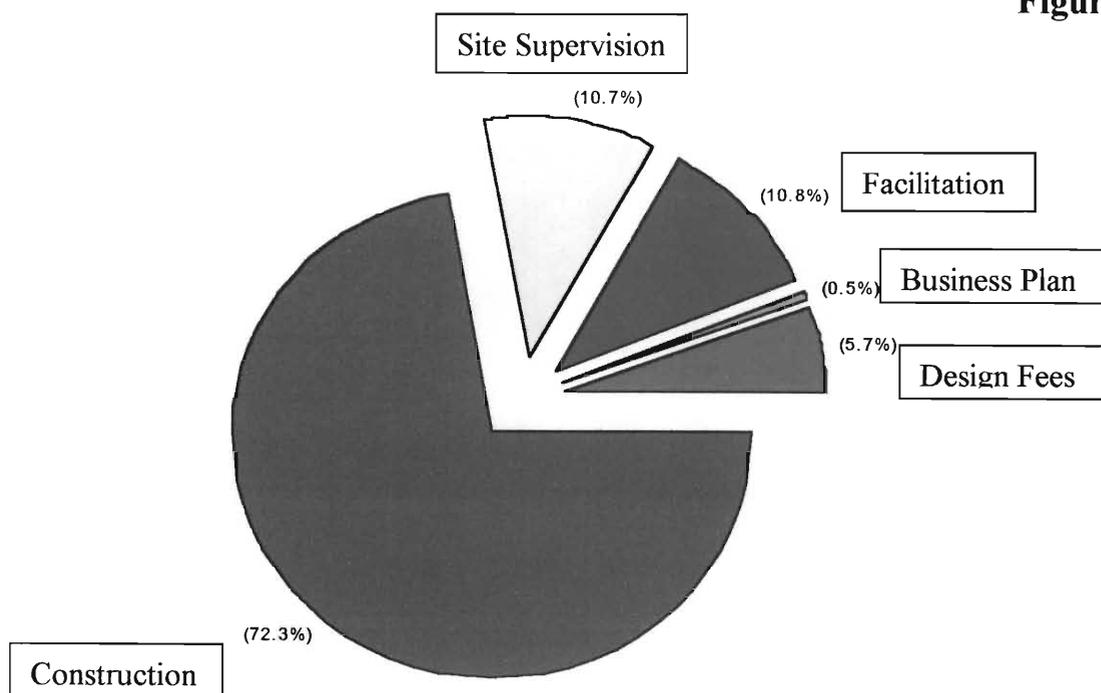
After the close of tenders a tender report was prepared by the consulting engineers and presented to the PSC for comment and approval. The Tender Board accepted the recommendations that the contracts be awarded to three local contractors. One local contractor submitted the lowest tenders for all eight contracts but clearly did not have sufficient capacity or resources. Materials supplied under separate contracts were issued to the labour supply contractors as required. The labour supply contractors hired labour in each ward using the Watsan committees to assist in the recruitment and selection of labour. The intention of the engineers in adopting this approach was to give emerging local contractors an opportunity to work in a conventional civil engineering contracting environment, and to develop business skills which they could use to obtain other work and continue operating profitably in the future. Labourers worked for the contractors on a task basis and were covered by Workmen's Compensation and UIF. Wages were paid in accordance with the minimum wage order for the civil engineering industry. In other words there was no requirement for a community contribution in the form of "sweat equity".

The consulting engineers employed site staff to monitor quality and progress in the conventional way, but who also gave assistance and on site training as required. The sewer reticulation is substantially complete and the quality of workmanship has been good. Progress has been slow however due to a number of technical factors such as rain, and the presence of unexpectedly high levels of ground water and rock. In addition the contractors have encountered cash flow difficulties due to inexperience in financial management, a lack of understanding of productivity effects, and inappropriate company structures in some cases. They have had to receive assistance in making legitimate claims for additional payments for adverse or unforeseen working conditions. There have been very few labour problems and those that have arisen have been resolved with the assistance of the PLO and the ELDC.

The new sewage treatment works was constructed under conventional civil, mechanical and electrical engineering contracts as the technology required is not available locally. Local labour was used for all unskilled or semi-skilled work, again with employment selection through the PLO and the committees.

The contracts were scheduled for completion at the end of May 1998 but will only be completed in February 1999. The total cost of the project increased from the original estimate of R13.3 million to approximately R15.5 million. The breakdown of costs is shown in Figure 9 below. This shows that “soft” issues accounted for 10.8% of the project cost.

**Figure 9**



One of the problems encountered in the services upgrading work carried out between 1986 and 1990 was that of the responsibility for installing and maintaining toilet facilities on each residential site. Very few of the residents were in a position to afford the cost of construction but the government was not prepared to grant funds for facilities which would become the property of the householder. By 1996 however the Housing Subsidy scheme was in place and the consulting engineers suggested that funds could be obtained for housing which would include toilets. An application for Project Linked subsidies was drafted by the consulting engineers in consultation with the ELDC and the town administration. The application was approved by the PHB at an estimated total value of R27 million. A separate office was established to administer this part of the project. A senior administrator was employed and seven clerks were selected from the community after interviews conducted by a sub-committee comprising representatives of the ELDC, the town administration and the consulting engineers. A condition of a successful subsidy application is that the applicant must construct a toilet.

The first applications for subsidies were processed in October 1997 and the construction of houses commenced in July 1998. The consulting engineers for the sewer reticulation project were appointed as Developers and Project Managers for the Housing scheme as well, and adopted an innovative method for the supply of housing to approved beneficiaries. Conventionally a Developer is also responsible for the construction of houses. The size and type of house offered to beneficiaries is therefore usually only of one form and such that the Developer can minimise his risk and maximise his profit – the smallest possible structure for the largest amount of money. In this instance the cost of services is low, due to the fact that the bulk of the roads in the town are not surfaced, and the balance available for top structures is unusually high at about R11 000.00 for a maximum subsidy of R15 000.00. The Project Managers called for tenders from housing contractors for houses up to that value. Tenders from four contractors were accepted. Each contractor was required to erect a show house and beneficiaries could select whichever house they wished. The contractor is paid the balance of the subsidy due to the beneficiary on completion of the house. Construction is subject to PHB rules and quality control by the Project Managers, and the building must be acceptable to the beneficiary before payment can be made. So far this method has proved to be successful and appreciated by the beneficiaries.

The communications strategy for the project included verbal communication at formal meetings confirmed by minutes, and a professionally produced newspaper. The meetings included the following:

- Fortnightly, and later monthly, PSC meetings
- Special meetings to consider particular issues as required
- Monthly Watsan committee meetings
- Monthly construction site meetings
- Independent meetings of the ELDC and of the professional team
- Public meetings

The newspaper and public meetings were the main form of communications between those directly involved with and responsible for the project in the PSC and the residents of Ekuvukeni. The budget allowed for about twelve issues of the newspaper produced approximately every six weeks. The content was determined by the specialist communications consultant after discussion with a sub-committee which was also required to approve the draft of each issue. The language of the newspaper was Zulu and five thousand copies of each issue were distributed - approximately two per household. (Figure 10)

The communications consultant recommended to the PSC that ideally the newspaper should be developed so that it could continue in the future. Accordingly articles were included on subjects which were not project related. The objective was to involve local people in the newspaper who would gain sufficient experience so that they would be able to assume full responsibility for its production. Also since grant funding for the newspaper will cease at the end of the project it was necessary to consider means of ensuring its long term financial viability. Unfortunately local interest was minimal and no issues of the newspaper have been produced since the first quarter of 1998.



# Izindaba zaseKuvukeni

No 1

December 1996

Asivukeni Sekusile

## Ukufakwa kwamathoyilethi ashaywayo Ekuvukeni

Amathoyilethi amabhakede Ekuvukeni asezoqedwa. Abantu baseKuvukeni sebekhalaze iminyaka eminingi ngalenhlobo yamathoyilethi. Zonke izinkinga ebezikhona ngamathoyilethi amabhakede zizophela nya.

Indlela entsha yokuthutha indle ngamapayipi izofana ncamashi naleyo esetshenziswa emadolobheni anjengo Zakheni, Madadeni, Pietermaritzburg naseThekwini. Lendlela entsha izokwenzela abantu baseKuvukeni izinto zibelula futhi ihlanzekile.

Ingxenywe yemali yokwenza lomsebenzi izoqhamuka esikhwameni sikaHulumeni omkhulu sohlelo lwe- RDP, kuthi enye ingxenywe iqhamuke kuHulumeni wesifunda. Uma abanikazi bemizi befuna ukuxhunyelwa amathoyilethi kulendlela entsha, kuzodingeka bakhokhele amathoyilethi amasha, ukuxhunywa kwawo emapayipini endle, kanye namanzi.

Abamele umphakathi waseKuvukeni bacele ukuthi umphakathi abawumele waziswe ngaloludaba. Uhlelo lokwazisa umphakathi luzokwenzeka ngemihlangano emawadini kanye nangaleliphaphandaba. Izindaba zaseKuvukeni enye yezindlela zokwazisa izakhamuzi zaseKuvukeni. Lizoqokatha izindaba zentuthuko kanye nemibono ngendawo yaseKuvukeni. Lizobe likutshela ngemivuzo yalomsebenzi wokukhuculula indle, izinkinga kanye nezindleko. Leliphaphandaba lizophinde futhi likutshela nangeminye imisebenzi yentuthuko endaweni. Leli kuzoba iphaphandaba elizolethela abantu izindaba libuye futhi libe izwi labantu baseKuvukeni.



### Okucukethwe kulolushicilelo

- Owangamele lomsebenzi? 2
- Onyakeni ka-1997? 3
- Kuzongibiza malini mina? 4

The following stages of the project remain to be completed:

- ① Final commissioning of the sewer reticulation network.
- ② Acceptance of the Business Plan for administration, operation and maintenance of services in the town.
- ② Finalisation of metering and billing systems.
- ④ Further workshops on tariffs and options with the ELDC, then with the Watsan Committees, and finally in public meetings.
- ⑤ Continuation of the housing subsidy scheme scheduled for completion in August 1999.
- ⑥ Development of a programme for the establishment of local government organisations in compliance with provincial government policy.
- ⑦ Development of local competence in administration, operation and maintenance of services.

During 1997 responsibility for administration of the town passed from the provincial Department of Local Government and Housing to the uThukela Regional Council. The Council did not have the capacity to carry out this function and contracted with the Development and Services Board (DSB) to assume its responsibilities for administration, operation and maintenance. The contract was not discussed with local community representatives but was given legitimacy through approval by the Regional Council which has members resident in Ekuvukeni. The DSB is a relic from the previous Natal Provincial Administration, and is itself going through a protracted process of transformation. Its capacity at a technical level is severely limited and it is doubtful at present if the organisation will be able to operate and maintain the services in the town with the required degree of efficiency to make payment for services acceptable to the town residents.

## 5.0 DISCUSSION AND CONCLUSIONS

“The Constitution..... recognises the fact that the dignity of the individual is both an objective which society must pursue, and is a goal which cannot be separated from the material wellbeing of that individual.” (24 (Mbeki, 1998, p34))

“... we have begun to lay the foundation for political, economic and social transformation of the entire fabric of social life. In South Africa the national agenda for the achievement of this transformation is familiarly known as the Reconstruction and Development Programme. There is general acceptance in our society that any form of development which is not accompanied by the transformation of the fabric of life would only help to entrench and widen distortions and disparities.....” (24 (Mbeki, 1998, p48))

The above quotations from speeches made by the Deputy President of South Africa indicate the background of policy within which development, particularly as defined in the RDP, should be carried out in South Africa. By the very nature of the practicalities of the RDP, engineers are important contributors and their actions have considerable influence on the success or failure of development at project level, and on whether the intentions implied by policy will be met. It is necessary therefore to examine the model of development within which engineers typically operate, and then to consider whether this model is appropriate in the context of government policy objectives and social realities.

Engineers do not operate in a field where their activities are self-defined. Their actions are generally controlled and managed by bureaucrats charged with the implementation of policy. It is of course open to question whether this control is efficient or effective. Also the position of control does not imply that engineers, or indeed other disciplines, are not in a position to strongly influence that control. Nevertheless current policy and its application should be considered before any examination of the role of engineers. The case studies described in the previous section were of developments in rural and semi-rural areas, therefore only particular policy as it relates to rural areas will be considered.

## 5.1 Policy

Policy as a general plan of action to be adopted by government, is determined in a democratic society, by politicians to meet at best the objectives for which they were elected, or at least such objectives sufficient for them to be re-elected when their term of office expires. New policy or policy reform is adopted by new governments to change past directions or plans of action to meet revised objectives. Governments are made up of people drawn from widely differing backgrounds who are answerable to a variety of constituencies.

In the past the setting of policy or policy reform was thought to be entirely linear, from agreement and establishment of the rules based on desired or currently accepted political philosophies, leading to decisions, and finally implementation which was assumed to be a purely technical issue. Policy was set and implemented by the state based on the assumption that the interests of the state were identical with at least the majority interests of the public. There was a degree of acceptance that there was an element of altruism and that the state would attempt impartially to meet the needs of all, even if, more cynically, its principal motive may have been to retain power. There was also some acceptance that the rules and procedures established by policy makers would be observed and carried out by the officials answerable to government, and that the majority of the population would accept and conform with the rules. By the 1980s the situation had changed and it was more commonly agreed that the state was incompetent, corrupt and inefficient, and that while it might be in a position to establish the philosophies behind plans of action, it could not carry out implementation. This was the responsibility of the private domain and the market. The new theory was that the market responded to demand and supply signals conveyed by changes in prices and was more effective and efficient than the state.

In the 1990s it can be argued that policy and implementation are subject to processes of iterative negotiation between the major institutions of development - the state, the market and civil society. None of these on their own can be effective without the co-operation and involvement of the others.

There has been an assumption that the rules and procedures established in terms of policy will be interpreted by all state officials and by society in the same way and that implementation is a purely technical problem. In fact policy is interpreted and manipulated by groups and individuals to serve their best interests at any given moment. There is a continuous process of negotiation in the implementation of policy to suit specific situations and particular spatial and temporal demands. In this sense therefore, policy reform is largely reactive to situations and to changes in markets and society.

Interpretations of policy which do not adequately meet the objectives of those setting the policy, require policy reform. Changes in government imply more dramatic and significant changes in policy. Altered rules and procedures emanating from these policy changes however, must be implemented by many of the same people responsible for implementation under previous policies. This is particularly notable and problematic in South Africa today where the political changes have been dramatic while the changes in bureaucratic personnel are happening more slowly and tortuously.

Little can be done to encourage the objectives of economic growth and improved social welfare unless policies create a climate appropriate for the promotion of these goals, and unless institutions are in place which are organised ultimately to support these goals in the form intended by the policy makers.

Reform in policy may not lead to desirable outcomes for all. If the outcome for some is perceived as a loss, the policy will be opposed and challenged. Challenges of sufficient strength will lead to further negotiation and further policy reform.

In the realm of development, and more particularly rural development, Chambers' notion of 'putting last first' <sup>(8)</sup> is aimed at development for those who are most in need. Intuitively there seems little point in directing development actions and energy at groups who have a degree of self-sufficiency while ignoring those who are worse off. The implication therefore is that such energies should work up from the lowest or most needy level.

There are a great number of problems associated with this approach both from the perspective of policy and from that of implementation. Policy and practice which lead to improvements in welfare and greater economic benefits for some but which lead to a perceived deterioration in the quality of life of others, however small, are likely to be resisted by those whose positions are threatened. The implementation of such policies is usually in the hands of people who are more affluent and influential than those who are the targets of the initiative. The agents of change and those on the periphery of the target population will expect and aim, themselves, to derive some benefits. Policy reform and practice in development is usually directed from the perspective and understanding of those in power without necessarily determining the perspectives of those who are the targets of change.

Chambers<sup>(8)</sup> notes a new approach by the World Bank to rural development in 1975:

“Rural development is a strategy designed to improve the economic and social life of a specific group of people - the rural poor. It involves extending the benefits of development to the poorest among those who seek a livelihood in the rural areas. ”

He suggests however that the approach is a statement typical of those who are not themselves the ‘rural poor’ and that an alternative approach could be:

“Rural development is a strategy to enable a specific group of people, poor rural women and men, to gain for themselves and their children more of what they want and need. It involves helping the poorest among those who seek a livelihood in the rural areas to demand and control more of the benefits of development. ”

While such an approach may be entirely desirable, it must also be possible and politically and socially feasible. Policies and programmes designed specifically for the “last” are frequently commandeered to extract benefits for those less in need but in positions of greater power or influence. Success frequently requires that the rich and powerful act against their own interests which is an unlikely outcome. It is prudent to identify first who will lose and who will gain through the implementation of a reform or development programme. Chambers gives a simple table using examples of how programmes and outcomes can be compared with regard to the extent that they benefit two categories of people:

Programme Type	Rural Elite	Rural Poor	Examples
A	Gain	Lose	Allowing or enabling elite to appropriate common property resources (land, ground water, fish, forests, pasture, reeds, silt, stone etc.) denying these to others. Technology with net livelihood-displacing effects
B	Gain	Gain	New services accessible to all (health, water, education, shops with basic goods etc.) Most public works which create new infrastructure. New irrigation or other technology which increases employment and raises wage rates. Canal irrigation reform from which all farmers gain. Development of a resource where all share in its exploitation.
C	No change	Gain	Extending coverage of spread-and-take-up programmes to be accessible to more of the poor. Credit for enterprises for the poor. Subsidised rations for the poor. Appropriate technology for resource-poor farmers
D	Lose	Gain	Land reform with inadequate compensation. Implementation of minimum wage legislation.

**Table 3 Development Programme Benefits**

He suggests that political feasibility should be as much a part of appraisal as technical, economic and financial feasibility. It is not sufficient to rely on a spirit of altruism or idealism to achieve the required objectives.

The water supply project in the Limehill Complex commenced before the current government was in power and before its new policies such as the RDP were defined. However the principles of policy implementation and the associated difficulties were still applicable. Albeit unconsciously, the project was aimed at material relief for a poor community within development principles which were little different from those adopted later in the RDP. At the start of the project in 1992 there was no coherent policy or direction from provincial government for development in rural areas of KwaZulu at a time when national policymakers were still more concerned with maintaining the position of the apartheid government. Management and control responsibilities rested largely with locally based government officials operating in a loose and undefined arrangement with tribal authorities. The decision to proceed with an expansion to the water scheme was made by engineering personnel based on the fact that there was an under-utilised new water treatment facility and an old works using old technology and with inadequate capacity. The decision was not based on a co-ordinated development plan.

The initial definition of the scope of the project owed nothing to consultation with the ultimate beneficiaries, but in its implementation there was a continuous and iterative process of negotiation with appointed members of the community in the form of the LCUWC. It is not possible to state that these members represented the interests of their community or that they engaged in regular and sufficient consultation with their supposed constituency. They were however conscious of a perceived allegiance to the Amakhosi.

The Amakhosi and their Councillors appeared themselves to be more concerned with the reactions of the people to the requirement to pay for water than in assuming any long-term local government responsibility. Their position was one of representing all the diverse interests of the people without attempting to carry responsibility for the delivery of services. This problem of the potential conflict between representation and the provision and management of services is addressed by Friedman <sup>(17)</sup>:

“.....service provision is not the prime purpose of electing local government: like all levels of elected government, it is meant to be the source of representation. Direct service provision is thus a core function of elected municipalities only if it is demonstrated that this is an essential feature of the representative function. In principle, however, there is no necessary connection between representing interests and directly providing services. Indeed, there may be a conflict between the two since the effect of the assumption may be ‘to write the electorate into the role of the passively waiting receiver of delivery and representatives..... as merely dispensers of packages of public goods.’”

The engineers carried out the project based on their own perceptions of the needs of the local population within the development paradigm of modernisation modified by the harsh segregation policies of the time. In terms of Chambers’ tabulation, the project contained elements of type A, B and D programmes. Under type A the elite gained in that they were in the best position to take advantage of job opportunities emanating from the project. Under type B the majority of the population benefited from improved services even though they would be required to pay for water. Under type D the elite in one area lost the business and income from supplying water and installing house connections even though the business was “illegal”. Such a situation emphasises the complexities of development projects and serves to illustrate the fact that development is not a purely technical process.

The first phase of the Ekuvukeni project commenced in 1986 and was carried out very definitely within the policy framework of the previous government. The officials were the same as those responsible for the Limehill Complex project and had little capacity or interest in social development. Even at that time however questions were being raised around cost recovery and sustainability to guide policy for the provision of services. Proposed improvements to sanitation were not achieved firstly due to the requirement by the DBSA as funding agents to exclude waterborne sanitation in favour of VIP's which were deemed to be more appropriate in terms of affordability, and secondly due to the somewhat unexpected resistance by the community to this decision. Proposals to install metered house connections and thence to impose charges for water consumption came to nothing due to the lack of capacity and drive from the local authority. The project team was composed solely of engineers operating largely outside any influence from other disciplines and within their own perceptions of a development paradigm.

The second phase of development in Ekuvukeni commenced in 1992 and has continued through the change in government to the present. In a direct reversal of the decision taken just three years earlier to install VIP's, the engineering officials in the government (local authority) decided to proceed with the installation of waterborne sanitation to replace the bucket latrine system. Plaistowe <sup>(25)</sup> suggests that:

“Clearly this development does not accord with government policy in that waterborne sanitation is far more sophisticated and expensive than a sanitation system needs to be to meet basic health and functional requirements.”

and:

“... government .... will have to adapt its policies on cost recovery and local authority responsibility to suit the socio-economic and institutional realities of Ekuvukeni.”

However Vaughan <sup>(29)</sup> notes that:

“Rural areas throughout South Africa have been shaped and conditioned by past policies. These past policies have influenced or determined settlement patterns and demographic profiles, access or lack of access to services and facilities, and the location and character of economic activity. Present interventions need to be informed by a clear understanding of the effects of past policies.”

Arising out of such considerations she suggests further:

“The rationalisation and co-ordination of service provision, and the provision of infrastructure is crucial to realising the economic potential of better endowed areas, as well as to improving the quality of life in depressed areas. Levels of investment in infrastructure and services need to be guided by the potential of these investments to release and mobilise productive resources.”

Similarly Budlender <sup>(5)</sup> notes that:

“Policies and practices need to be judged on the basis of their outcomes for the disadvantaged, not on the theory on which they are based, although the theory will inform our (correct or incorrect!) understanding of why they succeeded or failed.”

In the IDF for Ekuvukeni and the draft regional plan for the Region, Ekuvukeni is planned for development as a sub-regional resource centre. While it is not the purpose of this study to discuss planning issues in detail, it is worth noting that in the context of current planning and the past policies which created Ekuvukeni and the adjacent settlements in the Limehill Complex, the installation of improved services prior to further economic development can be justified.

Bond and Dube <sup>(3)</sup> discuss at some length the impact of policy on the delivery of services. Their argument leads to the recommendation for more generous subsidies, increased standards and more effective roles for state and communities. In particular the comment is made that:

“If in future, policy-makers incorporate into infrastructure policy, programme and project design the full economic costs and benefits of different options, they may in the process add crucial concrete detail to the general case for the redistribution of income in a society whose inequality is said to be second worst of all major countries. . . . While the broader net economic benefit of higher infrastructure standards should be self-evident, they are not yet reflected fully either in policy or in local-level implementation.

However, coming to this conclusion is not only a matter for open-minded technical specialists. It is a political struggle, and the balance of forces at present requires that a wide variety of

organisations – notably those actually involved in grassroots development implementation – become more involved in detailed controversies surrounding the infrastructure and services debate.”

The Ekuvukeni project was driven initially by a team consisting largely of engineers guided by their own perceptions of policy and development requirements. More recently however other disciplines became involved and exerted some influence on project objectives. Not the least of these was the local community in the form of the ELDC. The implementation of the project has passed through a period of change in government at all levels, and a period when the status and form of local government has also been under intense scrutiny and change. The result has been a greater awareness by the engineers of policy and socio-economic imperatives, but little change in their overall responsibility for the project. This responsibility has not been taken over effectively by local authority officials whose “butterfly” involvement has continued – hovering and contributing randomly and ineffectively. The engineers’ perceptions of development therefore still predominate.

Government policy requires consideration of such elements as capacity building, empowerment, sustainability, and affordability. <sup>(1, 12, 13, 19)</sup> It is appropriate to consider these aspects as they affect the role of engineers in development.

## **5.2 Capacity Building and Empowerment**

Capacity building is a part of the development process in which people are the heart. In order to achieve successful development, however success is defined, it is necessary to build human capacity to initiate and sustain the process. There is no single or unique way to build capacity. Each individual and each group of individuals is unique and effective capacity building interventions must address unique needs at a particular stage of development at a particular time. Greater capacity implies the desirable objective of improved performance and hence the ability to deliver and sustain development. Cook <sup>(32)</sup> notes that performance builds capacity but warns that too great a demand for performance can destroy capacity through stress and collapse. Capacity building and empowerment are not simple transfers of skills but a more complex process that requires understanding of individual needs and community dynamics. Bell <sup>(2)</sup> writes that:

“... development is not necessarily empowering and empowerment does not necessarily lead to development. On the contrary, empowerment often leads to empowered apathy or empowered oppression of others and development often takes place at the expense, and in the face of, empowerment.”

Empowerment cannot come without improvement in capacity but does not mean merely training in particular project related skills. Similarly greater capacity will not be achieved without empowerment – the two are interrelated and have elements of subjectivity, objectivity and competence. Cook <sup>(17)</sup> writes:

“... individuals become more powerful when they grow in the subjective sense of feeling able to do things hitherto out of reach; when they develop the ability to do things which were not previously within their competence; and when doors of opportunity, which were previously closed, swing open to allow them access to information, influence, and opportunity.”

The old saying that to give a man a fish feeds him for a day, but to teach him to fish will feed him for a lifetime, presumes that the teacher himself knows how to fish in the same circumstances as the pupil, and that the pupil has access to the required resources. This brief overview serves to illustrate that capacity building and empowerment are complex and long-term interactive processes. Interventions require certain skills and knowledge beyond conventional training schemes.

The efforts at capacity building in the Limehill Complex and Ekuvukeni projects were initiated and managed by the engineers. Specialist training organisations were consulted and engaged for on-site and classroom based training of community members. These were aimed generally at developing competence related directly to project requirements. Subjective and objective empowerment initiatives occurred but were to some extent unconscious. They grew with the projects through participation in meetings and recognition that choices could and should be made by individuals and groups in the community. This was most noticeable in the increasing degree of participation by committee members in PSC meetings. In the early stages of each project, meetings served generally as forums for the engineers to explain the project and to lead committee members towards approving project objectives and details. The chairmen of the PSC's performed a nominal role of control and direction and occasionally acted as the group spokesperson. This changed in later stages into more active participation, some assumption of responsibility, and challenges to assumptions made by the

engineers or the local authority. Improved capacity has also been noted generally in the local population in their ability and willingness to adopt systems and methods introduced both in the process of construction and in the use of new infrastructure. There has been no further analysis as to whether the training and capacity building efforts have achieved any long-term effects. Although such analysis would be desirable and could assist in achieving required and appropriate outcomes, budget constraints have limited any further investigation. The situation is typical of development projects where technical considerations tend to carry the most weight.

Since capacity building and empowerment are requirements of government policy in development, it is important that engineers are aware of the complexities and move beyond token training programmes. Continuity should be established through effective co-ordination between the project engineers, the local authority and community representatives to achieve long-term benefits. The major problem is in the achievement of a common understanding of medium and long term social and political elements of development. Without such a common understanding and without associated commitment the short-term involvement by the engineers during a project will achieve little.

Sustainability and principles of cost recovery are desirable outcomes of projects and of empowerment and capacity building initiatives. These are considered in the next section.

### 5.3 Sustainability, Affordability and Cost Recovery

Sustainability has become a buzz word amongst development practitioners in recent times. The concept of sustainability is open to wide interpretation depending on the interests and concerns under consideration. The most widely quoted definition is that given in the 1987 report of the World Commission on Environment and Development, *Our Common Future*, also known as the Brundtland report. There, sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. While the concept appears to focus on the natural environment, sustainability also includes concern for the social, economic and political elements of society. From an environmental perspective the objective is to manage and maintain ecological systems and resources. From an economic point of view the aim is to maximise welfare within financial and capital constraints, and sociologically the emphasis is on human relationships and the patterns of social organisation. Sustainable development therefore requires balancing and mutual achievement of these often conflicting objectives.

That a project or even development as a whole should be sustainable appears at first glance to be self-evident. Many projects however presumably originally conceived as sustainable have failed for a variety of reasons including human, economic and environmental incompatibility. FitzGerald et al <sup>(17)</sup> suggest that:

“Making development sustainable means moving beyond a narrow, albeit important, concern with economic growth *per se* to considerations relating to the quality of that growth. That is ensuring that peoples’ basic needs are being met, that the resource base is conserved, that there is a sustainable population level, that environmental and cross-sectoral concerns are integrated into decision-making processes, and that communities are empowered. Sustainable development is concerned with improving the overall quality of life as well as satisfying human needs.”

Such an admirable approach may well be appropriate to guide national or provincial policy. Unfortunately reality is more messy. There are so many unknowns and variables at the local level that success is dependent on interpretations of requirements by people who may not be conversant with the theoretical background. There is rarely adequate co-ordination between policymakers, local authority officials, community organisations and the wide variety of implementing agents.

Consequently conformation of projects with a policy of sustainability is often accidental. The onus therefore is on those responsible for implementation to ensure that policy objectives are met. The concept of sustainability is often diluted at project level to mean conservation of the environment and payment for services to cover the costs of operation and maintenance. These are imposed on the “target” population by development practitioners frequently without sufficient knowledge of the circumstances of that population. Friedman <sup>(18)</sup> qualifies this approach as follows:

“... infrastructure investment may founder on unexpected and misunderstood realities if it ignores the possibility that citizens may be organising themselves in ways which do not conform to the expectations of (the) elite who assume that the rest of society shares their assumptions and circumstances....

... The assumption that citizens will meet their obligations if these are pointed out to them ignores the reality that there may be obstacles to exercising a conventional civic role far more formidable than lack of knowledge of civic principles (which, if survey evidence is a guide, is not lacking in any event).”

The water supply project for the Limehill Complex was driven by local needs as perceived by the local authority and the engineering team, and by the requirement of the local authority to generate financial viability (sustainability) for the water treatment works. There was no research into local affordability levels. As the project developed and local understanding grew, at least by the PSC members, demand and cost recovery principles started to coincide. Nevertheless the system is still not financially viable although the operational methods adopted by the Regional Council may lead to it becoming so at some time in the future. It is difficult to determine what could have been done differently to realise the mutual objectives of meeting local needs and of sustainability. Almost certainly the correct conclusion is that expectations of “success” within a short period of time were unrealistic. Therefore the only problem was the programme. The required objectives may well be met in the longer term.

Having learnt from the Limehill Complex project, the development efforts for Ekuvukeni were structured differently. The decision to proceed with the installation of waterborne sanitation to replace the bucket latrines may have been questionable given current state policy and development principles. Nevertheless the level of local consultation was more co-ordinated and the technical and administrative team was better informed by the socio-economic survey. The purpose of the survey

is given in the introduction to the report produced on the findings of the survey<sup>(23)</sup>:

“i) to provide base-line socio-economic information about the Ekuvukeni community; ii) to explore the community’s understanding of the project, including issues around payment , maintenance and general management of the proposed sanitation system; and iii) to analyse the findings with an eye to achieving an effective and sustainable outcome which meets people’s needs.”

The conclusions of the study report are contained in Annexure A of this study. *Inter alia* the report concludes that sustainability of the sanitation scheme from the perspectives of both users and the local authority, depends on affordability for the largest number of households and effective and efficient management and maintenance. A draft Business Plan for the town prepared by the engineers shows that the town has been fully subsidised since its creation and is unlikely to be financially self-sustaining for at least ten years. This projection is qualified however by the possibility of significant economic development leading to increased affordability levels and the establishment of an effective rates base. The Business Plan and proposed management systems have not yet been adopted by the local authority.

The socio-economic survey revealed a general willingness to pay for improved services although there was an incomplete understanding of the full cost implications of owning and operating waterborne sanitation facilities. Rogerson<sup>(27)</sup> states that there are many uncertainties regarding the willingness to pay for water. Quoting Crane writing in *World Development* in 1994, he states that:

“information... ‘regarding the demand for water by the urban poor, including the amount they pay, where they find it, and how they would react to change in either prices or supply structures remains relatively scarce.’”

The situation regarding sanitation is even more confused. Rogerson quotes a 1992 World Bank study:

“... the practice of sanitation planning has become a kind of routine, cook-book style exercise that is out of touch with the realities that massive subsidies are unavailable and that the needs of the poor are not being met. .... little attention is paid to consumer demand for sanitation because it is typically assumed that either everyone will want to connect to the

sewerage system at whatever price is charged or public health benefits are so important to the community and the service will be so heavily subsidised that no-one will have reason not to connect.”

In the particular case of Ekuvukeni these warnings were heeded to some extent, firstly by obtaining as much relevant information as possible, and secondly by structuring the project to take advantage of legitimate available capital subsidies. Thus the capital costs of the sewer reticulation and the treatment works were fully subsidised. In addition the provision of sewer connections and toilet facilities were also subsidised for low-income households through the PHB housing subsidy scheme.

Further research, monitoring and evaluation will be necessary to determine whether the waterborne sanitation scheme has been both appropriate and successful.

#### **5.4 Conclusions**

The case studies selected for this research confirm the complexity and diversity of rural development as well as the pivotal nature of the involvement of engineers. It also confirms the benefits to be obtained from a coordinated multi-disciplinary approach which continues beyond the involvement of engineers during the initial implementation stage of a project.

It is apparent that the engineering profession has become more aware of the human and environmental dimensions of its work. This awareness is tempered however by the lack of capacity and initiative in local government which must carry the responsibility for coordination and the implementation of policy.

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# **ANNEXURE A**

EKUVUKENI SOCIO-ECONOMIC AND  
SANITATION SURVEY  
FOR THE  
WATER AND SANITATION PROJECT

Researched for  
KNIGHT PIESOLD (PTY) LTD.  
CONSULTING ENGINEERS

by  
TESSA MARCUS  
CHARLES MANDIVENYI & MATHEW PLAISTOWE

of the  
Community Agency for Social Enquiry

## V Discussion, Conclusions and Recommendations

The study reveals Ekuvukeni to be an urban settlement in a rural location. It has a stable population of low or very low income households with very limited sources of livelihood. Structurally, the average household has five or more members of whom at least four depend on a single income source - because of age and unemployment. A substantial minority of households know periods of food shortage during the month, with a minority of about ten per cent who are in absolute poverty. Less than a fifth of households have a monthly income which keeps them out of relative poverty.

Ekuvukeni is also a town in which the community is strongly committed to replacing the existing bucket system with waterborne sewerage as the main form of sanitation.

The town has various institutions of governance, some of which have only been recently created, and in which the community has varying degrees of confidence.

The socio-economic circumstances and institutional capacity of Ekuvukeni is the context in which it is necessary to examine the critical "soft-ware"<sup>3</sup> issues about willingness to pay, affordability and cost recovery as well as maintenance and management. These are practical applied policy matters which have to be resolved by all parties if the proposed sanitation scheme at Ekuvukeni is to enjoy any measure of success.

The research found that the strong commitment of Ekuvukeni households to waterborne sanitation translated into a general willingness to pay for its operational and maintenance costs. Getting rid of the bucket system is considered a priority issue in Ekuvukeni and most households want flush toilets.

Willingness to pay for the service depends, significantly, upon whether it is affordable or not. Households are acutely aware of the limits of their income and what they felt they could set aside for sanitation. The overwhelming majority consider it possible to pay a service fee of between one and two percent of their monthly household income. However, many are concerned that they would not be able to afford to connect to the system without state support, even if they could afford a service charge. Also, having never had the system in their own homes, Ekuvukeni households are making these estimates without any experience of the real costs of maintaining the system in their

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<sup>3</sup> During the International Drinking and Water Supply and Sanitation Decade (1981-1990) many of the technological issues around water and sanitation provision have been satisfactorily resolved. But, on their own, they have been unable to bring about the desired improvements mostly because of social issues - especially people's ability and willingness to pay. These have been termed the "soft ware" of water and sanitation provision. See Rogerson CM 1996

houses and the impact that these may have on their ability to use and stay with the service. In order for willingness to pay to be translated into actual payment and service use, the cost of the whole service - inside and outside the home- needs to be made known as far as is possible.

The level at which service fees are set will have a direct bearing on whether households can afford to use the system. State policy is committed to recovering the costs of operating and maintaining water and sanitation systems from consumers. But the parameters in which the terms of cost recovery are set is far from cut and dried. The circumstances of Ekuvukeni, where people want the service but have limited means to pay for it, poses a series of related questions that need to be answered.

- i) What policy route would be best to ensure its maximum use and therefore, effectiveness while ensuring long term sustainability through service fee payment?
- ii) Should the full costs of maintaining the system be recovered or should the state aim for partial cost recovery to encourage maximum use?
- iii) Should the fee for each part of the system be set independently, without regard to other service payments that households have to meet?
- iv) Also, should the fee be set regardless of private maintenance costs and what would the cost implications be to public system maintenance where private maintenance levels are poor or inappropriate?

From the research, it would seem that the sustainability of waterborne sanitation in Ekuvukeni requires that the fee for public system operation and maintenance needs to take three factors into account - household income, the cost of all essential public services, and private system maintenance costs. It should also aim to be affordable to the largest number of households. This is both to ensure that genuine inability to pay is restricted to a very small proportion of township households, and that a culture of payment becomes common place and widespread. It should also help reduce the impact of default.

A clear set of guidelines needs to be developed by the community in conjunction with the management committee and government which gives direction on anticipated non-payment. Amongst other things, it should set a target to limit the number of service fee defaulters, where households don't pay for services, processes and procedures should be clear and publicly known so that actions taken by service providers are acceptable, consistent and fair.

Even if a service fee is set that is affordable for the majority of households in Ekuvukeni, there will be a sizable minority of households who presently cannot and may never be able to connect into water borne sanitation. Their sanitation needs can be addressed in several ways. One option is to connect them up and to build their non-payment into the service cost. But the problem remains as to where the money to cover their share of the service and maintenance costs is to come from. The government cannot afford to commit to covering their costs. The ability of the community to bear this cost is also doubtful. Although about half the household respondents said they are prepared to pay to cover the needs of the genuinely poor, this willingness presumes that there are very few households who fall into this category and that the monthly fee will not rise beyond the low levels which the

overwhelming majority consider affordable. It is also likely to undermine the principle and practice of service payment within the community.

Alternatively, a more viable option is to develop a dual but compatible sanitation system. Given preferences and expressed willingness to pay, the main system should be waterborne sewerage. However, where households recognise that they are unable to connect up to and maintain flush toilets, they should be able to opt for a VIP latrine system which is designed in such a way as to be convertible into the waterborne system should their economic circumstances improve. Choosing this option requires intensive and detailed work with households and the institutions of Ekuvukeni to ensure that people are able to make real and realistic choices.

Turning to management issues which are critical to effective service delivery and maintenance, it is clear that there is a need for considerable institutional development as well as capacity building in the community.

Households find it difficult to imagine the management tasks and responsibilities involved in waterborne sanitation. Their general preference for an appointed rather than an elected management committee would seem to hinge around concerns about financial controls, skills and efficiencies as well as effective service delivery. Moreover, there is a general ambivalence around who the sanitation committee would be accountable to, which is reinforced by the on-going lack of clarity about where final responsibility for overall township management is to lie.

Clearly, while it is evident that households do not want to take overall responsibility for managing sanitation services (or indeed, any other), they do want a say in how it is managed and they want to be kept informed about project progress and problems. They expect that members of the committee will undergo systematic management training. And, households need and expect to get information and to acquire skills which will give them capacity to use the system efficiently and effectively. The project is seen as generally contributing to people's quality of life and as a source of potential employment.

There are many potential sites of conflict within the community and between the community and government as service providers in this project. It is absolutely essential that the framework for sanitation provision and project implementation comes out of a partnership between the community and government. The government needs to understand the limits of affordability and the constraints these place on the types of sanitation services to be provided. Ekuvukeni households need greater exposure to the real issues and problems with both system and management options in order for them to make informed choices that are viable. In sum, the project needs to be put considerable effort into the software of service provision and delivery in order to ensure that the new sanitation system gets up and running and remains of use to the people it is intended for.

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<sup>i</sup> The Household Subsistence Level (HSL) is an absolute poverty line devised at the Institute of  
Planning Research, University of Port Elizabeth.