REPORT NO. P3-6

LEAD PROGRAMME IN TECHNOLOGIES FOR ENHANCED ENVIRONMENTAL MANAGEMENT

OUTPUT TRACKING SHEET

Project Phase: Phase 3

Title: The State of the Environment and Health in Alexandra, Johannesburg

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Version: Version 9 - FINAL

Reviewer: Michelle Binedell

Date of finalisation: June 2000


Sign-off: ..............................................
Project manager

THE LEAD PROGRAMME IS FUNDED BY THE DEPARTMENT OF ARTS, CULTURE, SCIENCE AND TECHNOLOGY
THE STATE OF THE ENVIRONMENT & HEALTH
IN ALEXANDRA

A Report Prepared by

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June 2000
EXECUTIVE SUMMARY

Decades of bad planning and development decisions in the context of apartheid have left a legacy of environmental degradation and hazards to health and safety in Alexandra, which local authorities and other stakeholders are now battling to address. The Alexandra community profile is characterised by high population density and growth rates, elevated levels of unemployment, an age profile skewed towards younger age categories, relatively low levels of education, and low monthly household incomes. Over and above, or in association with, this disadvantageous socio-economic profile, residents are exposed to wide-ranging and sometimes severe threats to health emanating from local environmental exposures. Settlement upgrading initiatives are costly. To ensure that investments are directed towards interventions of high yield in terms of environmental quality and health, it is important that decisions are based on sound research and information.

This document, through the collation of information from a series of stakeholder interviews, a community consultation workshop, a literature review, a database search and site visits to Alexandra, aims to identify and describe a selection of environmental health concerns occurring in Alexandra.

The first section of this document outlines the processes adopted in the compilation of this report. In Section Two, an outline is given of the emergence of current thinking in relation to environment, health and development. Section Three focuses on the particular factors and processes occurring in South Africa, which have implications for environmental health status. A brief history of Alexandra is given in Section Four, emphasizing the factors that have led to the extent of environmental degradation to be seen today.

The fifth section provides a broad description of the environment and population of Alexandra, whereas Section Six concentrates on the information available in relation to specific aspects of the environment in Alexandra, including, for example, housing, water, sanitation, waste, air quality, safety, food preparation and the risk of disasters. In Section Seven the limited information available is used to describe aspects of the health of the people of Alexandra.

In Section Eight a preliminary set of core environment and health indicators is proposed to
monitor the impact of recent, current and planned development and improvement programmes on environmental quality, health status and well-being in Alexandra, whilst concluding remarks and recommendations are given in Section Nine.
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ACRONYMS

CSIR  Council for Scientific and Industrial Research
EMLC  Eastern Metropolitan Local Council
GJHBMC  Greater Johannesburg Metropolitan Council
MRC  Medical Research Council

ACKNOWLEDGMENTS

The authors wish to thank the following for their valuable contribution to this report:

- Bronwyn Curtis, Medical Research Council
- Russel Rimmer, Eastern Metropolitan Local Council, Scientific Services
- Jokkie Viljoen, Eastern Metropolitan Local Council
- Adolf Sihlaba, Eastern Metropolitan Local Council
- Ncumisa Mehana, Manageress of Health, Alexandra Community Clinic
- Eugene Cilliers, Greater Johannesburg Metropolitan Council, Disaster Management Officer.
- Dr. Neil Martinson, Eastern Metropolitan Local Council
- Sister Mary Radebe, Eastern Metropolitan Local Council
PREAMBLE

This work is being undertaken as part of a “Lead Programme”, funded by the Department of Arts, Culture, Science and Technology (DACST), awarded to the Council for Scientific and Industrial Research (CSIR). The programme is entitled “Technologies for Enhanced Environmental Management in South Africa”, and, as indicated by its title, the broad goal is to transfer technology to enhance and improve environmental management in South Africa.

As part of this programme, baseline studies of environment and health status are being conducted in two settings, namely Cato Manor (Durban) and Alexandra (Johannesburg). The study report in relation to Alexandra, will focus on the following key aspects:

- The historical/development context of Alexandra;
- A description of Alexandra;
- A profile of selected environmental exposures in Alexandra;
- A description of prevailing health concerns; and
- Recommendations for a possible set of environment and health indicators appropriate for use in Alexandra.

The report will also focus on possible approaches to developing environment and health information in areas where paucity exists.

This report is also associated with ongoing work in the field of environment and health being undertaken under the banner of the World Health Organisation Collaborating Centre for Urban Health (WHOCCUH). The WHOCCUH is a partnership initiative of the Medical Research Council of South Africa, the University of the Witwatersrand and the Greater Johannesburg Metropolitan Council. The broad goal of the WHOCCUH initiative is to support a focus on environment and health in ongoing planning and development initiatives in Alexandra.
1. THE RESEARCH PROCESS

In settings such as Alexandra, where a dearth of published information on health in relation to the environment exists, expensive and time-consuming primary research studies are often not feasible. Alternative approaches need to be adopted in order to gain an understanding of the priority environment and health concerns prevailing. Accordingly, in the preparation of this report, the following steps were taken to ensure the procurement of essential and available information:

?? Initial support for the project was obtained through presentations to key groups, for example the management committee and plenary groups of the Greater Alexandra Development Forum, and the comments and suggestions of those present noted;

?? A community consultation workshop was held in Alexandra at which a wide spectrum of community organizations discussed their perceptions of priority environment and health concerns in the area;

?? A literature search was undertaken to identify and obtain published information on the environment and health in Alexandra;

?? A literature review was conducted in relation to settings similar to Alexandra to obtain relevant environment and health information;

?? Personal interviews were conducted with key stakeholders; and

?? Databases, for example clinic statistics and the 1996 census database, were scanned for information relevant to the Alexandra setting.

?? Site visits were conducted to observe key areas of environment and health concern in Alexandra.

The experiences of the researchers showed that rather than a pre-structured approach to data identification and collation, a snowball sampling methodology – where research participants referred the researchers to other research participants and sources of information - worked best in the preparation of this report. Please refer to Appendix A for a the summary of the process.
Figure 1: Alexandra residents and stakeholders discussing key environment and health concerns in relation to maps of the area.
2. INTRODUCTION

2.1 ENVIRONMENT AND HEALTH DRIVING FORCES
Increasing awareness during recent decades of the deteriorating state of the environment has led to unprecedented attention being given to the broad impacts of human activity on the environment, world-wide. There is mounting recognition of the complex and inextricable linkages between the nature and level of development, the state of the environment, and health. There is recognition also of the impact of broad and complex processes on the state of the environment in any one setting. These processes, which may occur at local, national or regional levels, include, for example, population dynamics, urbanisation rates, poverty, inequity, and levels of scientific and economic development (WRI 1998).

2.2 CHANGING PUBLIC HEALTH APPROACHES
Following on from changes in our understanding of the environment-health-development relationship, has been the development of new approaches to public health worldwide. The Alma Ata declaration, the European Charter on Environment and Health, the Sundsvall Declaration on Supportive Environments for Health, the Ottawa Charter for Health Promotion, the World Health Organisation’s (WHO) Healthy Cities Project, and Local Agenda 21, represent milestones in the path to the “new” public health. These milestones have increasingly emphasised the role of the environment and development in health. Emerging conceptual frameworks for public health emphasize the promotion of good health and the prevention of disease through cross-sectoral planning, community participation in planning and development, the notion of sustainable development, as well as integrated, holistic planning and action in key settings, such as schools, workplaces and homes, and the use of emerging environmental management tools and technologies. These and other concepts now form fundamental pillars of the revised “Health-For-All” strategy (WHO 1995). Tools such as environmental health impact assessment, the use of environment and health indicators, the preparation of state of environment and health reports, are increasingly used with a view to health protection or promotion (WHO 1997).
3. ENVIRONMENT & HEALTH IN SOUTH AFRICA

3.1 “TRADITIONAL & MODERN” CONCERNS

Broadly defined, the human environment refers to the collective of surrounding physical, chemical, biological, social, cultural and economic conditions. The particular human exposures emanating from these conditions may vary, for example, according to time (of, for example, the year or day), place (for example geographical location, work or home), infrastructure and personal activity. In general, environmental threats may be separated into ‘traditional’ and ‘modern’ hazards, associated largely with under-development, and unsustainable development, respectively. ‘Traditional’ environmental health concerns may include, for example, a lack of access to safe water supplies, sanitation facilities and adequate waste disposal services. ‘Modern’ environmental health concerns, on the other hand, may refer to exposure to lead in the environment, ambient air pollution from vehicles, and chemical pollution of the environment from industrial activity. Developing countries tend to experience predominantly the former, and developed countries the latter. Countries such as South Africa, may be described as being on a path between traditional and modern environmental health concerns.

Having, simultaneously, elements of both a developed and a developing country, the people of South Africa may be at risk of exposure to the environment and health concerns associated with both traditional and modern hazards. In addition, a number of factors prevailing in the country predispose the population to particular environmental health risks. These factors include, for example, high degrees of poverty and inequity, high rates of urbanisation, relatively low levels of scientific and economic development, low levels of mass-based “environment and health literacy” and activism, and a poor tradition of sound environmental management practice. All of these phenomena are to be found in, or impact on, the quality of the environment and on health status in Alexandra, a spatially confined township to the north of central Johannesburg, accommodating around 150 000 people.

3.2 THE ROLE OF POVERTY & INEQUITY

There is little doubt that poverty is a powerful determinant of environmental quality, and of human health and well-being. A WHO report suggests that children from poor households in developing countries are 40 to 50 times more likely to die before the age of five years than
their developed nation counterparts. Compared to Europe and North America, infants and young children in developing countries are several hundred times more likely to die from preventable, environment-associated diseases such as diarrhoea and pneumonia. In the poorest countries of the world between a quarter and a third of all children die before the age of five years. Amongst the poorest people within these countries, as many as in two children die before that age (WHO 1992). Much of the poverty-related burden of ill health is preventable. The relationship between levels of poverty and a number of environmental, health and service factors was illustrated by a city-wide study undertaken in Port Elizabeth, a selection of findings from which is given in Table 1. As can be seen, the poorest communities tended to have the poorest environmental health conditions and service coverage (Thomas EP et al 1999).

Table 1

DISTRIBUTION OF A SELECTION OF SOCIO-ENVIRONMENTAL FACTORS BY WEALTH CATEGORY IN PORT ELIZABETH

<table>
<thead>
<tr>
<th>LEVEL OF WEALTH</th>
<th>low</th>
<th>lower-middle</th>
<th>middle</th>
<th>upper middle</th>
<th>high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tertiary education</td>
<td>1%</td>
<td>2%</td>
<td>5%</td>
<td>11%</td>
<td>18%</td>
</tr>
<tr>
<td>Access to piped water indoors</td>
<td>11%</td>
<td>27%</td>
<td>57%</td>
<td>82%</td>
<td>98%</td>
</tr>
<tr>
<td>Indoor toilet</td>
<td>13%</td>
<td>19%</td>
<td>38%</td>
<td>72%</td>
<td>97%</td>
</tr>
<tr>
<td>Rats/mice seen during past 24 hours</td>
<td>55%</td>
<td>46%</td>
<td>22%</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>Electricity used for cooking</td>
<td>19%</td>
<td>36%</td>
<td>84%</td>
<td>94%</td>
<td>100%</td>
</tr>
<tr>
<td>Zero household members who smoke inside the home</td>
<td>33%</td>
<td>41%</td>
<td>46%</td>
<td>56%</td>
<td>62%</td>
</tr>
<tr>
<td>Dampness in the home</td>
<td>75%</td>
<td>71%</td>
<td>44%</td>
<td>29%</td>
<td>16%</td>
</tr>
<tr>
<td>Problem with outdoor air pollution</td>
<td>85%</td>
<td>70%</td>
<td>54%</td>
<td>33%</td>
<td>18%</td>
</tr>
<tr>
<td>Land ownership</td>
<td>33%</td>
<td>40%</td>
<td>65%</td>
<td>69%</td>
<td>89%</td>
</tr>
</tbody>
</table>

Adapted from: Thomas E et al, Port Elizabeth 1000 household environment and health study 1999.

Links between the environment, development, poverty and health are complex and inextricable. Recent analyses indicate a trend of increasing poverty and inequity across the globe. In developing countries, ‘the poor’ tend to become concentrated in areas of ‘under-
development’ such as Alexandra, which are also of the poorest environmental quality. Poverty and environmental degradation are thus becomingly increasingly linked (WRI 1998). While large-scale poverty exists, the quality of the living environment, and hence the health of large numbers of people, is unlikely to improve. Due to their inherent vulnerability, and their disproportionate numbers amongst ‘the poor’, groups such as women, the elderly, adolescents and young children are at particular risk of ill health (WHO 1997; IFUP 1997).

In South Africa, an estimated 24% of the population lies below the international poverty line (WRI 1998). Inequity is well known to be associated with environmental degradation and ill health. During 1993, the South African Gini co-efficient for income distribution (a measure of inequality) was 62, amongst the highest in the world. At this time, 65% of the national income was being received by the wealthiest quintile of the population (WRI 1998). A study reported in 1984 showed that the average monthly income in Alexandra equalled R111.00 per capita (Ferrinho et al 1991). More than 80% of households sampled, had a per capita income of R150.00 or less (Pillay 1984). The poor in South Africa, including in Alexandra, often face a double burden of environmental exposure and disease, in that they are most likely to be exposed to traditional environmental health hazards (such as a lack of sanitation) as well as modern hazards (such as chemical exposures as a consequence of living in close proximity to industrial sites (Tabibzadeh 1989).

In terms of health and well-being, the true plight of the poor is often hidden, because of the aggregation of data across cities or areas (WHO 1992). In studies conducted in Bombay and New Delhi, India, infant mortality rates were 221 per 1000 in low income settlements, but were twice as high amongst the poorest castes within these settlements. A study of environment and health status in the Johannesburg inner city suburb of Hillbrow, has indicated that significant health disparities may occur even within an area as small as one squared kilometer or from one high-rise building to another (Mathee et al 1999). Some of the very poorest people may also be entirely excluded from urban and health statistics, due to their status as illegal immigrants or refugees (WHO 1992; WHO 1993).

3.3 MULTIPLE BURDENS OF RISK
With the characteristics of both developed and developing nations being found in South Africa, it may be expected that the population, especially ‘the poor’, would be exposed to a double burden of health concerns. An additional, emerging concern in South Africa, is the
burgeoning of informal sector income generating activities. As indicated by a recent study conducted in Soweto, in around 7% of homes, activities including clothing manufacture, food preparation, electrical repairs, motor vehicle repairs, panel-beating and spray-painting, shoe repairs, brick-making, and metalwork, were being undertaken, largely in the absence of health and safety programmes. For residents of such dwellings, in addition to risks from local under-development, threats to health may also emanate from exposure to chemicals used in home-based income-generating activity (Pick 1999). A related health risk in Alexandra relates to the keeping of animals such as sheep, goats, chickens and cattle, which is commonplace, leading to environmental contamination and degradation, consequent threats to health and community discontent.

3.4 ENVIRONMENTAL RACISM

Of particular note in South Africa, is the way in which the apartheid system, including aspects such as the influx control legislation, the Group Areas Act, and education and labour preference policies, have engineered the differentiation by race, of exposure to environmental hazards. For example, the location of mainly black people in township and informal housing settings predisposed this group to a wide range of environmental health threats. Table 2 gives the proportion, by former population group, living in informal settlements and with access to an indoor water supply.

<table>
<thead>
<tr>
<th></th>
<th>African/Black</th>
<th>Coloured</th>
<th>Indian/Asian</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion living in informal settlement</td>
<td>15.5%</td>
<td>4.2%</td>
<td>0.4%</td>
<td>0.06%</td>
</tr>
<tr>
<td>Proportion with a tap inside their dwelling</td>
<td>27%</td>
<td>72%</td>
<td>97%</td>
<td>96%</td>
</tr>
</tbody>
</table>

4. A BRIEF SOCIAL HISTORY

Alexandra township is located around 16 kilometres from central Johannesburg, nestled amongst Johannesburg’s mainly white north-eastern suburbs. Large parts of the township have the appearance of a slum area, and are, after 90 years of existence, in dire need of upgrading. A major portion of the residents live in informal housing structures crowded in small areas, and has to cope with excessive levels of noise. Freedom of movement in the area in general, is inhibited by high levels of crime and violence.

Named after the original owner’s wife or daughter, Alexandra was established in 1912 on the farm Cyferfontein. The piece of land was initially registered as an area for white settlement but due to a lack of demand from this group, was converted into a ‘Non-European’ or ‘Native’ township. The ‘native’ and ‘coloured’ families who settled in the township during 1912, were able to acquire freehold titles to their plots. Because the area was established before 1913, “Alexandra was excluded from the general provisions of the 1913 (Native Land) Act. The ‘continued acquisition’ by ‘Natives’ of land in the township was safeguarded by Section 8 (1) (i) of the Act, which exempted existing ‘Native’ Townships from the provisions of the prohibitive clauses of the Act (2). The Native Trust and Land Act of 1936, while recognizing and entrenching the statutory rights of existing ‘native’ townships, prevented any further townships like Alexandra from being established” (Sarakinsky 1984:2).

Because of a general reluctance to take on administrative responsibility for the area, Alexandra, for a considerable period of time, was excluded from government and municipal control. At the same time much of the Apartheid legislation, for example the Influx Control and Pass Laws, did not affect the area. These factors encouraged a rapid influx into Alexandra of people seeking employment in Johannesburg. However, because all African black people, including those living in Alexandra, still required ‘hard-to-come-by’ work permits prior to securing jobs in Johannesburg, large numbers of people remained unemployed, catalysing conditions of poverty, extreme overcrowding, and associated high levels of crime in the area, particularly during the 1940s.

Over time, and under pressure from surrounding white neighbourhoods where there was fear of ‘contamination’ and health hazards from Alexandra, numerous attempts were made by
local authorities and the State to eliminate the township.

The first such attempt to demolish Alexandra was made in 1939 by the North Eastern District Protection League, which was formed with the sole purpose of removing all black people from the area. During 1943 there was a further attempt by the Johannesburg City Council to expropriate Alexandra. The Council set aside 3 million pounds to remove and resettle township residents. However, areas such as Sophiatown and the Western Native Township received priority over areas outside of the official Johannesburg boundaries. Consequently, it was decided in 1944 to abandon the plan to remove people from Alexandra, in favour of improving conditions in the township.

A further attempt to eliminate Alexandra was made in 1950, when a motion was tabled in the Transvaal Provincial Council to have the township demolished. Once again, nothing came of it, and in 1952 the Mentz Regional Planning Commission recommended the retention of Alexandra as a “labour pool” for Johannesburg. However, the population of 100 000 at the time, was to be reduced to 30 000, through the relocation of unemployed residents, and housing of the remaining workforce in large single-sex hostels. Also, buffer areas were to be established between Alexandra and surrounding white neighbourhoods.

Subsequent to the Mentz report, a 1955 proposal suggested that responsibility for Alexandra be passed to the Peri Urban Areas Health Board with the following guidelines:
I. “In accordance with the Mentz recommendations to remove and resettle all Alexandra residents who worked in areas other than Johannesburg’s northern suburbs;
II. to end unlawful influx and residence;
III. to impose higher local taxes; and
IV. to purchase properties” (Sarakinsky 1984:6).

By 1958 the Peri Urban Areas Health Board controlled the township and started to “clean up” the area. After conducting a census to establish the number of legal residents, a permit system was introduced to control influx into Alexandra. All “illegal” residents, were resettled, willingly or unwillingly, in Meadowlands and Diepkloof. By the end of 1960, 25 000 people had been relocated.

Some construction of sewerage, drainage and sanitation facilities, as well as the establishment
of a clinic and improvements to electricity and lighting began, but by 1963 the Peri Urban Areas Health Board changed its plans and decided to remove all people from the area. This decision to demolish the township was the most concerted of all the efforts. The Board decided that in the place of family houses, a hostel city must be constructed to house only ‘single’ African men and women. All families were to be resettled in Thembisa, Meadowlands or Diepkloof. The main thrust of this plan was to eventually get rid of all freehold stands. As a result of these decisions, during 1963 and 1964, 45 000 people were resettled in other townships in the Johannesburg area.

Over time Alexandra residents often organised themselves around issues such as high transport costs and used strategies such as bus boycotts to exercise their rights. When faced with thousands of forced removals, an organization called the Save Alexandra Campaign under the leadership of Reverend Sam Buti was formed in 1964, with the aim of trying to save the township. Their campaign succeeded only in 1979, when the government, in the context of a very different political climate, reversed its 1963 decision and announced that Alexandra would be developed as a high-density area. All removals and demolitions were immediately halted and no additional hostels were built. Resident families would be permitted to remain, and plans were also put in place to redevelop the township.

An urban renewal plan for Alexandra was announced in 1986 as part of the ‘hearts and minds’ campaign of the Botha government. The idea was to change Alexandra into a middle class neighbourhood where residents could buy houses from the municipality. The redevelopment plan came to an end when funding dried up.

In 1980 Reverend Sam Buti formed the Alexandra Liaison Committee that assisted the authorities in administering the township, and acted as a liaison group in relation to community needs and concerns. When the Black Local Authorities Act was passed in 1983, Reverend Buti and his supporters were elected to the new Alexandra Town Council. Amid widespread political mobilisation during the 1980s, residents rejected the Town Council. A variety of civic and youth organisations were created along the lines of different political parties. Alexandra has never been a homogenous community, with its population divided along socio-economic and political lines. This political and socio-economic diversity continued into the 1990s. Currently, the main divisions relate to people living in formal relative to informal housing, as well as South Africans relative to immigrants from other parts.
of Africa.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1912</td>
<td>Establishment of Alexandra as a freehold township for “natives or persons of colour”</td>
</tr>
<tr>
<td>1939</td>
<td>First attempt to eliminate Alexandra – North Eastern District Protection League</td>
</tr>
<tr>
<td>1952</td>
<td>A planning commission recommends the retention of Alexandra as a “labour pool” for Johannesburg</td>
</tr>
<tr>
<td>1960s</td>
<td>Land expropriated from residents</td>
</tr>
<tr>
<td>1963/4</td>
<td>44 700 people resettled in Soweto and Tembisa</td>
</tr>
<tr>
<td>1979</td>
<td>State decides to retain Alexandra and develop it as a high density black area. Demolition plans are halted.</td>
</tr>
<tr>
<td>1980</td>
<td>Government acceptance of a Master Plan for the Redevelopment of Alexandra</td>
</tr>
<tr>
<td>1986</td>
<td>Launch of the Alexandra Urban Renewal Plan</td>
</tr>
<tr>
<td>1991</td>
<td>Signing of the Alexandra Accord, an agreement on rent, services and housing development, signed by the Alexandra Civic Organisation, the Transvaal Provincial Administration, the Alexandra Town Council, and the councils of Randburg and Sandton.</td>
</tr>
</tbody>
</table>
5. A DESCRIPTION OF ALEXANDRA

5.1 BIOPHYSICAL ENVIRONMENT

Alexandra has been described as amongst the most polluted and degraded living environments in South Africa. The township comprises a roughly rectangular piece of land located around 16 kilometres to the north of central Johannesburg. The area is unique in that it is the only black Johannesburg township located in close proximity to industry and a range of characteristically urban amenities. This is in contrast to other South African urban townships, which are usually located some distance away from urban centres. The residential suburbs of Marlboro, Kelvin, Lombardy East and Lombardy West are in close proximity to Alexandra. Kew, Wynberg, Wendywood, Bramley View and Marlboro are industrial sites, which in the late 1980s accommodated around 400 workplaces (Rex 1991). London Road borders Alexandra to the south, while to the east, the Jukskei River separates “old” Alexandra from the East Bank and Far East Bank (Raymer 1989).

5.2 POPULATION AND SOCIO-ECONOMIC ENVIRONMENT

Alexandra population estimates have varied widely in the past, and have also been regarded with contention. According to CASE (1998), reported population figures have varied from 124 408, to as many as 800 000 in some reports. The estimate in 1998 was in the region of 157 329 people. This estimate is in keeping with the 1996 census data, which reports the population of Alexandra at approximately 136, 727. Whatever the exact figure, the concentration of people in a small area contributes to a picture of extreme overcrowding and environmental degradation. In 1998, the Alexandra population density was estimated at 1 person per 29 squared metres or 34 000 people per squared kilometre. By comparison, a recent study estimated the population of central Johannesburg to equal 120 600. The central Johannesburg geographical area is however around 8 times larger than Alexandra (CASE 1998). For the purposes of this report, the population of Alexandra will be regarded as in the region of 137 00 to 150 000 people.

Males comprise 54% of the population of Alexandra (SSA 1998). The age distribution of the Alexandra population is given in Figure 2.
As can be seen from figure 2, the 21-30 year old age category (usually the most economically productive age group) accounts for the major portion of the Alexandra population, and may be associated with people migrating to Johannesburg to seek employment. Importantly, approximately 18% of the population is younger than ten years of age, which may indicate a high birth rate in recent times. In addition to the economic strain on the economically active proportion of the population in relation to the social welfare of this group, there are also planning and development implications in terms of responding to future population growth in Alexandra. Thus the birth rate and ongoing migration into the area may pose increasing challenges to city planners and managers in Alexandra. As can be seen from Figure 3 below, which gives the population in Alexandra from 1912 to the present, there has been rapid population growth in recent years.

Figure 3 shows how the population of Alexandra has grown since 1912 when Alexandra started with 40 families on the farm Cyferfontein. Of particular importance is the dramatic growth between 1921 and the 1950’s. At this time, the population grew from approximately 2548 to about 100 000 in the 1952. As mentioned earlier, the Mentz Regional Planning Commission recommended the retention of Alexandra as a “labour pool” for Johannesburg. The population of 100 000 at the time, was to be reduced to 30 000 and the unemployed were consequently relocated. This is reflected in the sharp decline seen for the mid-1950s, and early 1960s, when a further 45 000 people were relocated. From then, the population has grown steadily to the present day.

Recent population growth in Alexandra may also be attributed, at least in part, to an influx of ‘illegal immigrants’ who have made certain parts of Alexandra their home. For example, an area along the banks of the Jukskei River, commonly referred to as Maputo, accommodates mainly citizens from Mozambique. Because of the depleted economies in many of South Africa’s neighbouring countries, South Africa, and Johannesburg in particular, has been a popular destination for people seeking economic security. A community based socio-economic profile of Alexandra conducted in 1998 indicated that 2% of residents claimed to
have been born outside of South Africa. However, the report also states that this number may be an under-estimate, due to an unwillingness amongst respondents to reveal their true country of origin, for fear of prosecution. Whilst it is estimated that the proportion of illegal immigrants in Alexandra is significantly higher than 2% (CASE 1998), there are currently no reliable or accurate data available in this regard.

![Figure 4: EDUCATION LEVELS IN ALEXANDRA](image)


As can be seen from Figure 4, approximately 33% of the population either do not have formal education or have less than seven years of formal schooling. Fifty percent of the population have attended one or more years of secondary school, whilst 17% reported having a tertiary education.

Figure 5 shows that approximately 39% of the Alexandra population were unemployed, whilst 44% were employed, 10% were students or scholars and 4% were pensioners or retired.

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Whilst 44% of the Alexandra population were employed, this was mainly in low and semi-skilled jobs, usually associated with relatively low incomes. For example, more than one in four men were employed in trades such as plumbing, carpentry, electrical work and painting. Similarly, one in five women were domestic workers. There were few professionals such as doctors, lawyers and engineers residing in Alexandra (CASE 1998). Consequently, the average monthly household income was low. The average monthly income of households in Alexandra has been estimated to equal approximately R1029.00. Overall, men tend to earn more than women in Alexandra, with the major portion of men earning between R900.00 and R1499.00 monthly, while the greatest proportion of women earn between R500.00 and R899.00 per month (CASE 1998). These figures represent an aggregate across Alexandra, and may be misleading. In reality there is considerable heterogeneity across the township, with average incomes in more affluent areas being considerably higher than in informal settlement areas, for example.

In summary, Alexandra is a community characterised by a high population density, a high population growth rate, high levels of unemployment, a relatively young population, low education levels, and low monthly household incomes. Against the historical and socio-economic context outlined here, residents are also exposed to a number of environmental
concerns, which ultimately serve to threaten or compromise their health status.
6. ENVIRONMENTAL EXPOSURES

6.1 HOUSING

6.1.1 Overview of Housing and Health

One of the most effective ways of improving the health of people is to improve the quality of their housing and living environment. Housing of high quality not only serves as an important defence against ill health, death and injury, but also supports a state of ‘positive health’ implied by the World Health Organisation definition, which describes health as a state of physical, mental and social well-being, and not merely the absence of disease. Poor housing conditions, on the other hand, provide weak defences against death, disease, and injury and may even increase vulnerability to them (WHO 1987). The majority of the world’s population lives in shelter that does not meet the basic requirements for healthy housing. For an increasing number, available housing, rather than afford protection, may directly threaten their health status.

WHO adopts a broad definition of “healthy housing”, which goes beyond the mere physical structure, and includes the provision of basic environmental health services, as well as aspects associated with the broader living environment. Amongst the fundamental elements of healthy housing are included the shelter, water supply, sanitation, solid waste, wastewater, the site, access to housing (overcrowding), indoor air pollution, food safety, vectors of disease, the use of the home as a workplace, as well as aspects related to transport, education and shopping facilities (WHO 1997). A selection of housing elements and the implications for health are discussed in various sections of this report.

The design and structure, as well as the maintenance of buildings are important determinants of the health and safety of occupants. A failure to maintain adequate, health-based building standards may lead to building collapse during severe weather or disaster events. Certain structural features may favour the breeding and nesting of disease vectors, particularly if they fall into a state of disrepair. Poor ventilation for example, may lead to high levels of humidity, encouraging fungal growth which may in turn lead to respiratory ill health, for example asthma (WHO 1997).

Of particular concern are the health hazards occurring in informal settlements. In general, informal settlements are characterized by high-risk locations, ramshackle shelter, inadequate
access to basic environmental health services, and a lack of facilities such as transport, education and shopping. Living conditions in informal settlements predispose residents to a wide range of ill health conditions. Whilst demonstrating considerable ingenuity in the organization and building of housing at low cost, low-income households cannot address fundamental requirements for healthy living conditions, such as paved roads, drainage, sewer systems, treated and piped water, waste collection and treatment of injuries and illnesses (WHO 1992). There is often also an inequitable distribution of resources and expertise, for example environmental health officers, devoted to addressing concerns in informal settlements, relative to other areas.

The potential burden of disease from conditions commonly occurring in informal settlements is considerable. A World Health Organisation Commission on Health and Environment reported that many of the world’s most common causes of death from diseases could be prevented through improved housing and living conditions, better nutrition and comprehensive coverage of primary health care (WHO 1992).

Building materials themselves, may fail to protect, or may even threaten health. Dwellings in informal settlements, for example, are constructed from a variety of materials, including, plastic, cardboard, and corrugated zinc sheeting, which may afford minimal protection from extremes of temperature, noise and dust intrusion. Asbestos roofing, associated with serious conditions such as mesothelioma, asbestosis and lung cancer (Landrigan 1998; Berman 1986), has been extensively used in low-cost housing construction in South Africa, including in Alexandra, during recent decades. Analyses of data from a prospective cohort study of urban childhood environmental exposures and health (the Birth to Ten Project) indicated that around 52% of six-month old infants in Soweto were living in asbestos-roofed housing. A proportion of these houses were ageing and in a state of disrepair, as is the case in Alexandra. Six percent of respondents reported that a household member had personally undertaken repairs to an asbestos roof during the six-month period prior to the interview. Only 10% of respondents were aware that asbestos could adversely affect their health, or that of their children. The study indicated a need for vigilance in relation to the potential for current and future community exposure to asbestos in low-cost, ageing housing settlements in South Africa (Mathee et al 2000).
6.1.2 Housing in Alexandra

Housing in Alexandra ranges from free-standing brick homes to crowded informal housing constructed from various materials, and frequently located in or along high risk areas such as busy roads, along the banks and tributaries of the Jukskei River and on land formerly used as a waste disposal site. The 1996 Population Census indicated 41,605 dwelling units in Alexandra, classified into a number of dwelling types. The distribution of these dwellings is indicated in Figure 6 below.

![Figure 6: Distribution of Dwelling Type in Alexandra](image)


6.1.3 Formal Housing

Much of the formal housing infrastructure in Alexandra has been poorly constructed to start with, and also poorly maintained, and are consequently in a state of disrepair. The backyards of formal dwellings may accommodate large numbers of informal housing structures, and constitute an important component of the local economy.

6.1.4 Informal Housing Structures

Informal dwellings and shacks account for approximately 44% of all dwellings in Alexandra. There has been particular concern about the location of informal housing in Alexandra, for
example within the floodlines of the Jukskei River and its tributaries, encroaching on busy roads, and on former waste disposal sites. Informal dwellings in Alexandra have been built from a variety of materials, which may afford little protection against the elements or noise. The construction materials themselves may be hazardous, for example asbestos, and insulation materials such as polystyrene, which are highly flammable.

A study of the health of children in various parts of Alexandra showed that children living in informal dwellings were more likely to be malnourished, less likely to be immunized, more likely to have been delivered at home, less likely to have attended ante-natal or postnatal services, and more likely to have been breastfed for a long time or not at all (Ferrinho et al 1991).

6.1.5 Crowding
In general, dwellings in Alexandra are small and located in close proximity to each other. For example 63% of both formal and informal dwellings in Alexandra were reported to be one-roomed dwellings (CASE 1998). This implies the use of rooms for multiple functions. For example, rooms used for cooking, may also be used for sleeping, with the potential for exposure to elevated levels of indoor air pollution. Within dwellings, conditions are often cramped and crowded, a factor in the transmission of communicable diseases.

6.2 WATER SUPPLIES
6.2.1 Overview of Water Supply and Health
Sewage, nutrients, toxic metals, and industrial and agricultural chemicals may all contaminate water. Of these, the Global Environment Monitoring System (GEMS), found organic matter present in household sewage to be the most widespread pollutant. Water contaminated by sewage may expose users to a wide range of diseases caused by pathogens such as bacteria, viruses and other organisms. Diseases related to an unsafe and inadequate water supply include, amongst others, typhoid fever, cholera, non-specific diarrhoeal diseases, dysentery, skin infections and helminthic conditions. In addition to the direct effect on health, frequent bouts of gastrointestinal infections may reduce absorption of nutrients significantly, and reduce the body's general defence capacity against diseases such as measles and pneumonia (von Schirnding et al 1993).

In terms of health, both the quality, and access to sufficient quantities of safe water are important. Data from the 1996 South African census indicate that less than half of all South African
households have access to a tap inside their dwellings, whilst around 40% have no access to water on their dwelling site. Having to walk extended distances, or wait in long queues for water cuts the amount of water used by households to levels which may be insufficient to protect health (WHO 1992). A further concern is the storage and handling of water for drinking, and personal and domestic hygiene purposes. Genthe and colleagues (1997), reported on significant deterioration of water quality in a peri-urban settlement, following handling and storage, to the extent where indicator organisms exceeded national guidelines by 1 to 6 orders of magnitude. The authors identified improved hygiene and health knowledge as an important element of health improvement initiatives in such settings.

6.2.2 Water Supply in Alexandra
The water supply options commonly available in Alexandra are given in Figure 7.

The three main sources of water in Alexandra are indoor supplies (26%), on-site supplies (46%) and public taps (27%). The type of water supply option is linked to location in Alexandra. Around 90% of households in the East bank area and flats have access to water inside their dwellings. In contrast, only 5% of households in informal areas have access to an indoor water supply, which is well below the national and provincial (Gauteng) average of 64%. Sixty five
percent of households in the ‘Seswetla’ area rely on public taps for their water (CASE 1998).

Inadequate mechanisms and practices in relation to the disposal of used or wastewater may also pose risks to health. Visual inspections in Alexandra reveal pools of standing water, often alongside piles of refuse, providing fertile conditions for the growth of vectors of disease such as insects and rodents, and also serve to attract animals such as dogs, poultry, sheep, goats and cattle in Alexandra.

6.3 SANITATION SERVICES

6.3.1 Overview of Sanitation and Health

Human faecal matter is a highly toxic substance, containing a wide range of disease-causing pathogens. In order to protect public health, it is essential that faeces be removed from the living environment as quickly and effectively as possible (von Schirnding et al 1993).

The spread of sanitation-related diseases may occur through a number of pathways. For example, ill health may be caused through direct contact with faeces, when children, for example, put contaminated fingers into their mouths, or indirectly, when bacteria or other organisms are transferred to food or water by agents such as insects, rodents or fomites. In terms of disease-causing organisms, faecal matter may contain viruses, bacteria, protozoan or helminths (worms). Diseases associated with these organisms include, for example, polio, non-specific diarrhoeal disease, dysentery, hepatitis, cholera, typhoid, shigellosis, schistosomiasis, hookworm, ascariasis, and taeniasis. The health effects of inadequate sanitation facilities are of particular concern in crowded settlements such as Alexandra.

6.3.2 Sanitation in Alexandra

Sanitation systems currently found in Alexandra include flush toilets, pit latrines, bucket latrines and chemical (portable) toilets (Census 1996). The percentage of households using the various types is given in Figure 8.
According to the census data, as can be seen from Figure 8, 81% of the households in Alexandra have access to a flush or chemical toilet, 1% of households use pit latrines and approximately 15% use the ‘bucket latrine’ system. However, in Alexandra chemical toilets are usually provided for communal use in informal or squatter settlements. In terms of reflecting potential health risks, it would be preferable to separate these categories. Data from alternative sources indicate that only 25% of Alexandra residents have access to flush toilets inside their dwellings. Twelve percent of formal households have access to flush toilets while 1 in 25 (4%) informal dwellings have access to flush toilets (CASE 1998). In the ‘Seswetla’ area approximately 65% of residents reportedly use communal chemical toilets (portable) and 20% relying on the bucket system (CASE 1998). Figure 9 gives the distribution of non-flush toilets in relation to the enumerator areas used during the 1996 census. The highest concentration of non-flush toilets are to be found in the areas shaded in red.
Of particular concern in terms of health is the use of “bucket toilet” system, which may lead to soil contamination, predisposing those in the area to direct and indirect contact with faecal...
An associated sanitation concern in Alexandra, particularly in the informal areas, is the under-supply of chemical or portable toilets. A 1997 survey showed that in some part of Alexandra, up to 120 people were using a single toilet (Ibini-bini 1997). Personal interviews conducted recently indicated that additional toilets have since been provided (Neumisa Mehana, personal correspondence, 2000). However, concerns remain in relation to maintenance and generally poor sanitary conditions around these toilets. In addition, there was no evidence of essential hand-washing facilities being available.

In terms of bulk infrastructure, the sewer system in Alexandra, having been designed originally for a population of around 30 000 people, and currently serving a population of around 150 000, is inadequate. The inadequacy and degradation of the sewer system constitutes a major environmental and public health problem. Challenges faced in addressing the problem include the erection of dwellings over sewer maintenance points, and the development of settlements within the flood lines for the Jukskei River and in public open space areas.

6.4 WASTE DISPOSAL
6.4.1 Waste Disposal and Health
Household solid wastes may include leftover food, packaging and other redundant items, as well as hazardous substances such as paints, medicines, solvents, cleaning materials and batteries. In informal settlements, uncollected solid waste may pose numerous risks to the local population. Young children may be at risk of injury, poisoning or infection from waste in streets or local open space. Organic waste may attract insects and other household pests, as well as animals. Fermentation processes in organic waste may cause foul smells and also create conditions favourable for the growth of microbial pathogens. Uncollected solid waste may also obstruct storm water run-off, leading to the formation of stagnant pools of water, which may in turn facilitate the breeding of mosquitoes and other insects (WHO 1997). The local combustion of waste is a common occurrence in informal settlements, with the potential for elevated levels of ambient air pollution, as well as risks of burn injuries to residents, particularly young children, in the area.
6.4.2 Waste Disposal in Alexandra

Figure 10 gives the main mechanisms for waste removal from Alexandra.

As can be seen, waste from 76% of households is removed at least once weekly, 15% is removed less frequently by the local authority, whilst 3% percent make use of a communal refuse dump.

Although waste is removed on a regular basis in Alexandra, the volume of waste generated, as well as waste disposal practices, pose a challenge to waste collection departments. For example, although households are supplied with plastic bags for waste disposal, many of these are left on the road and ripped open by animals. Some do not make use of bags and waste is illegally disposed of along streets and in other spaces.

6.5 SURFACE WATER QUALITY

The Jukskei River and its tributaries form a focus for parks and recreational areas in and around Alexandra. While the river itself should offer opportunities for recreational activities...
for members of Alexandra and other communities, water quality investigations have indicated the river to be extremely littered and polluted, posing an eyesore and serious health risks to all who use it. As and after it passes Alexandra, the river is devoid of aquatic life, and has been described as having amongst the worst water quality in the entire country.

Monitoring programmes conducted indicate that levels of *Escherichia coli* (an organism which indicates faecal contamination of the water) in the Alexandra area are consistently higher than at other monitoring points along the length of the Jukskei River. As the river passes Alexandra, mean pollution loads increase by 56 to 89%, grossly exceeding all national guidelines. For example, in the region of Alexandra, *Escherichia coli* levels as high as 30 million/100ml have been determined, which might be expected from raw sewage. Unacceptably high levels of *Escherichia coli*, are routinely measured in the Jukskei River at Alexandra (Campbell 1996). During summer months, children frequently use the Juksei River for full (swimming) or intermediate (paddling, canoeing) contact recreational purposes. Table 3 gives the measurements for three key parameters upstream and downstream, as well as at Alexandra.

<table>
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<th>Table 3</th>
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<td>WATER QUALITY IN THE JUKSKEI RIVER</td>
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<tr>
<td>Area</td>
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<tr>
<td>Up stream</td>
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<td>Alexandra</td>
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<td>Downstream</td>
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Source: Johannesburg Eastern Metropolitan Local Council

The major source of bacterial pollution of the Jukskei River is inadequacy and extensive degradation of the sewer system in Alexandra. A further source of pollution is indiscriminate dumping of waste on the banks of the river. Water quality in the Jukskei River is particularly poor during rainy periods. Authorities attempting to improve water quality in the Jukskei River are faced with major challenges that include the existence of squatter settlements along the riverbanks and tributaries, dwellings built over sewer lines, and the overall situation of extreme overcrowding. However, unless these challenges are met, water quality in the Jukskei River around Alexandra is unlikely to improve, and associated threats to environmental quality and health will continue.

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6.6 AIR QUALITY

6.6.1 Overview of Air Quality and Health

Millions of children die each year in developing countries, and many millions more suffer from acute and chronic ill health as a result of air pollution. In parts of Africa acute respiratory disease accounts for a quarter to a third of deaths in young children, and is the main reason for using the health services. There are indications that in some South African urban areas deaths from acute respiratory infection are becoming more important than from diarrhoea (von Schirnding 1991). The health effects of exposure to polluted air include serious diseases such as asthma, bronchitis, pneumonia, emphysema, lung cancer, and even death in severe cases, as well as ill health conditions such as shortness of breath, coughing, red or sore eyes, a sore throat, a runny nose and allergies (MRC 1998).

Although many activities such as cooking, space heating, cleaning and smoking of tobacco, as well as materials such as carpeting, curtaining and furnishing may all contribute to air pollution indoors, there is particular concern about the domestic use of fuels such as wood and coal for cooking and space heating purposes, which may cause extremely high levels of indoor air pollution. Measurements of indoor air quality in developing countries have shown levels well in excess of international air quality guidelines. Women, girls and young children, who spend a large proportion of their time indoors, or who participate in cooking activities, are at particular risk of exposure (UNEP/GEMS 1991).

In South Africa, large numbers of people living in informal settlements are without access to electricity, leaving residents reliant on fuels such as paraffin, wood and coal for cooking and heating purposes. Even where electricity has been supplied, economic constraints often lead to the use of electricity for a limited number of functions, such as lighting and entertainment, and the continued use of alternative fuels for cooking and heating. Under these conditions, residents continue to be exposed to elevated levels of indoor air pollution.

Very few in-depth studies of indoor air quality and health status have been conducted in South African informal settlements. Where measurements of indoor air pollution have been undertaken, the data indicate levels well in excess of international guidelines (Health Consulting Office 1998). The revised WHO air quality guidelines for Europe, reflecting growing evidence that there appears to be no safe lower limit for particulate exposure, no
longer gives a guideline value for PM$_{10}$. Instead, exposure-response data for mortality, respiratory symptoms, and service use are presented, with the recommendation that this information be used to decide local standards and policy (WHO in preparation). Against this background of ever more cautious attitudes to particulate air pollution in the developed world, it is of concern to note that PM$_{10}$ concentrations several times higher than international recommendations have been measured in informal settlements in developing countries, including South Africa. Respiratory ill health is currently the main reason for use of the health services in large parts of South Africa (von Schirnding et al 1991).

6.6.2 Air Pollution in Alexandra

In Alexandra, the use of paraffin and solid fuels for cooking is widespread in informal settlements. During winter particularly, as seen in Figure 11, when residents use wood and coal for space heating, a blanket of pollution may be seen to cover the township.

Figure 11
COOKING AND HEATING FIRES CONTRIBUTING TO INDOOR AND OUTDOOR AIR POLLUTION IN ALEXANDRA

These observations, as can be seen in Figure 12, were also reflected in a study recently conducted through a partnership Greater Johannesburg air quality monitoring project undertaken by the Greater Johannesburg Metropolitan Council, the Council for Scientific and Industrial Research and IVL (Sweden). The results showed some of the highest levels of
sulphur dioxide pollution to be occurring in the Soweto and Alexandra areas.

**Figure 12**

RESULTS OF AN AIR QUALITY MONITORING STUDY CONDUCTED BY A PARTNERSHIP OF THE GJMC/CSIR/IVL (SWEDEN)

Although the 1996 population census reveals that 91% of the Alexandra population have access to electricity, as outlined earlier, access does not imply use. For example, as indicated by Figure 13, the majority of households in Alexandra use paraffin for cooking purposes.
From Figure 14, which gives the distribution of fuel used for space heating purposes in
Alexandra, it can be seen that electricity accounts for 43% of fuel used, whilst paraffin and coal are used in 40% and 7% of households respectively. It should be noted that the census interviews were mainly conducted in summer months. Had the data been collected during colder periods, it may be expected that the proportion of households using polluting fuels such as coal and wood, would have been significantly higher. The Alexandra Community Clinic reports that the incidence of respiratory disorders is much higher in winter (Ncumisa Mehana, Personal Communication, 2000). There have also been reports of people suffocating from insufficient ventilation particularly when paraffin and gas units are left burning at night.

Environmental tobacco smoke constitutes a further important source of indoor air pollution. In a study of smoking patterns in Alexandra, it was shown that more men than women smoked. Eleven percent of men between the ages of 9 and 19 years smoked, whilst only 4% of women in this age category did. Twenty percent of those who had lived in Alexandra for more than 5 years smoked whilst only 14% of those who had arrived within the past five years smoked. These findings are in line with previous observations associating urbanization with higher rates of smoking. The study also showed higher levels of smoking amongst residents of informal settlements, relative to people living in formal housing developments. The author concluded that smoking was a major problem in Alexandra, and recommended that community-wide education campaigns be undertaken as part of a comprehensive primary health care strategy in Alexandra (Ferrinho 1994).

6.7 SAFETY

6.7.1 Overview of Safety and Health

Not only does the environment play a role in physical health, it also plays a significant role in the psychosocial health of the community. In particular, proper housing plays a vital role in reducing psychosocial problems. Increasingly, housing in urban settlements such as Alexandra fail to serve the role of promoting psychosocial health (WHO 1998). Overcrowding and the stresses of urban life may contribute to increased substance abuse, mental illness and violent behaviour. The urban poor have the additional burden of high levels of unemployment, living with insecurity of tenure and in unpleasant surroundings. Consequently, the safety and psycho-social well-being of community members are threatened.

6.7.2 Safety and Health in Alexandra

There is an ongoing association of Alexandra with crime and violence (Mail & Guardian –
3/4/98; The Star 1999; The Star 1996; The Star 1998). Data from the South African Police Services confirm that levels of serious crime in Alexandra are amongst the highest in the Johannesburg region. As can be seen from Figure 15, the number of murder cases reported at the Alexandra Police Station in 1998 was usually comparable to those reported at the busiest police stations in Johannesburg, often second only to the Johannesburg Central or Hillbrow Police Stations. Given the small surface area of Alexandra township, and assuming that the majority of cases reported are actually occurring in Alexandra, these levels would seem particularly high. Looking at it another way, during 1998 19% of murder cases were reported at the Alexandra Police Station, whilst this station is one of 20 in the Johannesburg area.

![Figure 15](source_url)

**Figure 15**

Murder Cases Reported to the Alexandra Police Station - 1998

![Bar chart showing number of cases reported at different stations](source_url)

Source: Official website of the South African Police Services

In Figure 16, the levels of selected crimes committed in Alexandra between January and June 1999 are compared with the national average. As can be seen, the levels of murder, rape, and robbery and housebreaking exceeded the average for the nation as a whole, whilst in other categories Alexandra figures were well below the national average. A number of factors ought to be borne in mind when considering the data presented here. For example, crimes reported to the Alexandra Police Station are not necessarily representative of all crime committed in Alexandra. Nor is it certain that crimes reported at the Alexandra police station were committed in the suburb.
The physical environment in certain parts of Alexandra may facilitate criminal behaviour. Because of housing density, numerous alleys and hiding spaces exist. For example, car hijackers have been known to ‘disappear’ into these alleys (Personal Correspondence 2000).

Apart from crime, there are numerous other safety hazards in Alexandra. For example, dwellings encroach on several roads, and pedestrians are forced to walk in the roads rather than on sidewalks. The lack of safe play areas for children also leads to children playing in busy streets. In several roads, residents have themselves constructed humps to decrease motor vehicle speed.

The risk of electrical shock is exacerbated through illegal electrical connections, which are visible along and across roads in Alexandra. In same cases wires are exposed, and could potentially cause electrocution.

Source: Alexandra Police Station & S. A. Police Service
6.8 FOOD PREPARATION

6.8.1 Overview of Food Preparation and Health

Harmful toxins occur naturally in all foods. Over time, human beings have come to recognize and avoid or adapt foods with naturally occurring toxins. In recent years there has been increasing concern over preventable bouts of food poisoning as a consequence of inadequate food handling, preparation and storage. For food-borne illness to occur, one of the following events must occur:

1. Bacteria must be present in the original food source and survive the food production and processing stages,
2. Bacteria enters the food preparation area either in the food source or food handler and contaminates other foods
3. Bacteria in food multiply under certain conditions and are present in sufficient quantities when consumed,
4. Bacteria produce a toxin when they multiply and a sufficient level of that toxin is present when consumed.

One of the best defences against food-borne illness is a safe water supply, adequate cooking and refrigeration temperatures (WHO 1998). Amongst the requirements for safe food preparation are the cleanliness of the preparation area, availability of proper sanitation facilities, high levels of personal hygiene amongst those involved in food preparation, access to clean water, and the control of pests. Adequate temperature control is important in the prevention of bacterial replication, and a refrigerator is essential in this regard. Steps should also be taken to avoid chemical contamination, for example from storage of food in lead-glazed containers.

Of particular concern in developing countries is food prepared on the street. Although the preparation and sale of food by informal vendors employs anywhere between 6 and 25% of the workforce in certain developing countries, this industry has been difficult to regulate, particularly in relation to health. In principle, foods that are prepared and consumed immediately should be safe. However, street foods may also be stored in unhygienic conditions and left to stand for extended periods before being purchased and consumed. In addition, hazardous chemicals and additives, notably unauthorised colorants and preservatives have been found in street-vended foods (WHO 1998). The consumption of food from the informal sector, as is the case for the formal food sector, may potentially pose a serious public health threat.
health risk to consumers, particularly in light of the large numbers of individuals who may be exposed to unsafe foods.

6.8.2 Food preparation in Alexandra

The number of informal vendors selling foods to the public in Alexandra has increased during recent years. In a survey conducted in 1998, it was found that vendors sometimes had to operate under unhygienic conditions which had implications for the safety of foods prepared (EMLC 1998a). For example, it was found that although most informal vendors had access to water, approximately 29% were about 50 metres from the nearest water point. This led to extended periods between water changes, to save on time and energy. In the same survey, it was found that approximately 86% of traders were using inappropriate water and food storage containers and approximately 90% were undertaking inappropriate water handling practices (EMLC 1998a). For example the same water was being used for all of hand washing, washing foods, and washing dishes. In addition, it was found that 81% of the food traders could not adequately control the temperature of food through the availability of adequate refrigeration and reheating facilities. Of particular concern was the finding that approximately 88% of traders operated on a full day basis. Consequently, food was often left to stand for longer than four hours (WHO standards for the length of time which food should stand at room temperature)(WHO 1998).

In terms of wastewater, disposal often occurred in the immediate surroundings. The EMLC (1998a) survey showed that because of inadequate waste water disposable facilities and practices, approximately 94% of vendors were contributing to the formation of pools of standing water, and the creation of associated health risks. Moreover, the report emphasised that 74% of vendors had problems with the hygienic preparation of food and that personal hygiene concerns could be detected in 66% of cases.

An assessment of the ‘formal’ food sector in Alexandra also identified a number of concerns. One of the major problems in the formal Alexandra food sector was the use of prepared food establishments for other purposes. For example, 14% of the establishments that sold prepared food also served as butcheries, 4% were dry cleaners and 64% were general dealers (EMLC 1998b). Particular problems identified in these settings, included the presence of flies, and a failure to separate wet (e.g. potato skins and other food waste) and dry refuse (papers and plastic wrappers). In the change rooms 99% of establishments visited had no soap available.
In the preparation area, 88% had no hot water available, 98% had no towels, none had nailbrushes and 86% had no hand soap available. Ninety percent of premises were not well maintained or clean, whilst 92% of the people preparing the food wore no protective clothing. Nails were long and unhygienic in 94% of cases, and 98% were not wearing required headgear (EMLC 1998b). In respect of temperature control, 63% of establishments were problematic, 65% had a problem with improper shelving, 78% had a problem keeping raw and cooked food separated, and in 70% the storage space was not protected.

Given the above findings, food handling and preparation can be described as a major concern in Alexandra. The EMLC has implemented various response interventions, with varying degrees of success, which have been reported separately.

6.9 ENVIRONMENTAL DISASTERS
6.9.1 Overview of Environmental Disasters and Health
The pattern of disasters is strongly associated with season. For example, floods are more likely to occur during the rainy season whilst fires are more likely to occur during the dry season. In general, human settlements develop in areas that are less susceptible to natural disasters. However, settlements accommodating the poorest portion of the population tend to develop in areas most susceptible to disasters. The human impacts of disasters such as fires and floods include loss of lives, injury and loss of property. However, there are a number of factors that may either alleviate or aggravate the human impact of natural disasters. These include the location and density of the settlements, the dwelling construction materials and the emergency support available to that settlement.

6.9.2 Environmental Disasters in Alexandra
Alexandra is located in, and characteristic of, an area that is highly susceptible to the impacts of natural disasters. The area is densely populated, many of the dwellings (particularly in the informal settlements) are constructed from flimsy, often flammable materials, or located within floodlines. A large proportion of households use open flames for cooking and space heating. Consequently, Alexandra has become synonymous with floods in the summer, and fires in the winter.

Fires are mainly associated with the use of paraffin and candles, and gas cylinder explosions (Eugene Cilliers, Personal Communication, 2000). Arson has also been associated with fires
in Alexandra. The rapid spread of fires in Alexandra has been associated with housing density and the use of flammable materials. On average 2 fires occur in Alexandra each year, with an average of 120 dwellings and an estimated 720 people being affected each time. Because the threat of fires in Alexandra is considerable, the EMLC have put together a response team, who report that 5 people have lost their lives due to fires in Alexandra during the past five years (Eugene Cilliers, Personal Communication, 2000).

Flooding affects Alexandra annually. A large number of informal dwellings have been erected within the floodlines of the Jukskei River. The water level rises rapidly during periods of heavy rainfall, washing away dwellings along its banks. This occurs mostly during the summer months of January, February and March. During February 2000 for example, approximately 500 shacks were washed away (Eugene Cilliers, Personal Correspondence, 2000). In addition, floodwaters carry material which may cause damage to infrastructure and serve as a hazard to river users (Eugene Cilliers, Personal Correspondence, 2000).
7. HEALTH STATUS

Given the environmental exposures outlined in Section 6, it is of little surprise that health in Alexandra is of continuing concern. A selection of health concerns, for which data could be procured, will be outlined in this section.

Due to their known vulnerability and the proportion of time they spend at home, women, young children, the elderly and those already ill, are at particular risk of suffering the health consequences of exposure to hazards in poor quality living environments.

7.1 HEALTH CARE FACILITIES

In contrast to the early years of its existence when there were no health facilities at all in Alexandra (Ferrinho 1991), the area is currently serviced by 4 health care facilities and one satellite clinic. These are the Eighth Avenue Clinic, the East bank Clinic, the Fourth Avenue clinic, the Thoko Mngoma Clinic, and the Watt Street facility serving as a satellite unit associated with the Fourth Avenue Clinic. In addition, the Alexandra Health Care centre, run by a non-governmental organisation, provides primary health care services, including curative and trauma services.

7.2 AVAILABILITY OF HEALTH INFORMATION

No holistic and integrated system for the collection and analysis of data in relation to important environmental health concerns exists for Alexandra. Whilst data in relation to selected ill health symptoms have been collected, these have not always been analysed. The data presented here were obtained mainly through limited health services statistics, interviews with health professionals, and through the discussions conducted at a consultative workshop. Additional information was obtained through a search of the published literature.

7.3 CAUSES OF MORTALITY

In a 1991 report on an analysis of death certificate records at the Alexandra Health Centre, it was shown that 60% of deaths occurred amongst children under the age of 1 year. Gastroenteritis was the most frequent killer of young children, while amongst adult males violence and trauma caused most deaths. The majority of trauma-related deaths in males were due to stab wounds. Respiratory tract infections, cardiovascular diseases, abortion and trauma
accounted for most deaths amongst adult women. Trauma deaths amongst women were mainly due to gunshot wounds (Ferrinho et al 1991).

7.4 TUBERCULOSIS
One of the primary reported health concerns in Alexandra is tuberculosis. The incidence of tuberculosis has increased dramatically over the past two years (Sister Mary Radebe, Personal Communication 2000). This rise is attributed to firstly, the influx of people into Alexandra and secondly, to the inferior living conditions outlined earlier in this report, well known to be associated with the spread of the disease. Table 4 gives the total number (new and repeats) of cases of tuberculosis seen at clinics in Alexandra during January, February and March, 2000.

Table 4
REPORTED CASES OF TUBERCULOSIS IN ALEXANDRA

<table>
<thead>
<tr>
<th></th>
<th>8th avenue</th>
<th>East Bank</th>
<th>4th avenue</th>
<th>Watt Street</th>
<th>Thoko Mngoma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>405</td>
<td>386</td>
<td>554</td>
<td>58</td>
<td>647</td>
<td>2050</td>
</tr>
<tr>
<td>February</td>
<td>526</td>
<td>474</td>
<td>558</td>
<td>96</td>
<td>717</td>
<td>2371</td>
</tr>
<tr>
<td>March</td>
<td>625</td>
<td>526</td>
<td>430</td>
<td>124</td>
<td>907</td>
<td>2612</td>
</tr>
<tr>
<td>Total</td>
<td>1556</td>
<td>1386</td>
<td>1542</td>
<td>278</td>
<td>2271</td>
<td>7033</td>
</tr>
</tbody>
</table>

Source: EMLC, 2000

7.5 RESPIRATORY TRACT INFECTIONS
It is reported that respiratory tract infections in Alexandra increase dramatically during winter months. The increase in winter is thought to be attributable to the poor protection offered by many of the informal dwellings, coupled with the indoor burning of combustible fuels such as coal, paraffin and wood (Sister Mary Radebe, Ncumisa Mehana, Personal Communication 2000).

7.6 SKIN INFECTIONS
Health care facilities in Alexandra are perceived to treat high numbers of skin rashes and sores, especially amongst young children. Clinic staff highlight overcrowding, insanitary play areas for children and malnutrition as important potential causes of skin infections (Sister Mary Radebe, Personal Communication 2000). Young Children are often observed to play in the informal rubbish dumps and waste water streams that exist in Alexandra.
7.7 DIARRHOEA/VOMITING
Diarrhoea has been reported to be a common cause of morbidity in Alexandra children, with marked increases in levels occurring in the summer.

7.8 CHILDHOOD NUTRITIONAL STATUS
A community-based study conducted amongst 450 children aged 12 to 23 months was conducted in Alexandra during April 1990. The results showed that 18% of boys and 9% of girls were below the third percentile of weight for age (wasting). In terms of height for age (stunting) 44% of both boys and girls were below the 3rd percentile. Less than 4% of girls and boys were below the third percentile for weight for height. These findings indicated a high percentage of children suffering from stunting, but not from malnutrition.

More children from informal dwellings (79%) had weights below the 50th percentile for age than those from formal dwellings (68%). Similarly, 53% and 40% of children from informal and formal dwellings respectively, had heights below the third percentile for age.

Overall the study found that severe protein energy malnutrition was rare in Alexandra. However, the percentage of underweight children was high, and the percentage of children with stunting was extremely high. These findings were comparable to other communities in the Cape and Oukasie. The authors concluded that socio-economic factors and exposure to poor environmental conditions were associated with the higher prevalence of poor nutritional status occurring in informal dwellings (Coetzee & Ferrinho 1994).

7.9 COMMUNICABLE DISEASE
Whereas outbreaks of communicable diseases were common in the past, their incidence appears to be decreasing, possibly in association with more active immunization campaigns in the area. However, in light of continuing factors which may predispose the area to disease outbreaks, ongoing vigilance would be advisable.
<table>
<thead>
<tr>
<th>Year</th>
<th>Disease</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>Polio</td>
<td>(6 cases)</td>
</tr>
<tr>
<td>1986</td>
<td>Measles</td>
<td>(8 cases, 2 deaths in the first six months of the year)</td>
</tr>
<tr>
<td>1987</td>
<td>Measles</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>Measles</td>
<td></td>
</tr>
</tbody>
</table>

### 7.10 CHILD ABUSE

In a study conducted by Howard and colleagues indicated that over a 21-month period during 1989 and 1990, 140 cases of child abuse were seen at the Alexandra health Centre and University Clinic. Of these, 90% were girls and 35% were aged 5 years or younger. Sexual abuse accounted for 82% of cases.

### 7.11 CHILDHOOD BLOOD LEAD BURDENS

During recent decades there has been increased concern about the health effects of childhood exposure to lead in the environment. Amongst the health effects of particular concern are included neurobehavioural impacts (deficits in intelligence), anaemia, shortened concentration spans and poor school performance.

As can be seen from Figure 17, in a study of childhood blood lead levels conducted in selected Greater Johannesburg suburbs during 1995, children living in Alexandra tended to have amongst the highest blood lead levels. Overall around 80% of children had blood lead levels which exceeded or equalled the international guideline of 10 µg/dl.
Figure 17
BLOOD LEAD DISTRIBUTION IN GREATER JOHANNESBURG

STATE OF THE ENVIRONMENT & HEALTH IN ALEXANDRA
8. ENVIRONMENT & HEALTH INDICATORS

The relationship between the environment and health is complex, with a variety of factors and processes playing multiple roles. During recent years, a health and environment cause-effect framework has been developed which reflects on the relationships operating between driving forces, environmental pressures, environmental states, human exposures, health effects and actions aimed at minimizing or preventing these effects.

Typical forces, which may act as drivers of the state of the environment and health in a particular setting, include population growth, the urbanization rate, the level of technological development, the level of economic development, rate of industrialization, and the degrees of poverty and inequity. Driving forces result in pressures on the environment, which may be generated by all economic or development sectors, including for example the transport, energy, housing and industrial sectors. Pollution, for example from the combustion of fossil fuels, vehicle emissions, or pesticide application, is an important example of an environmental pressure. Environmental pressures, in turn, affect the state of the environment. Thus concentrations of lead, ozone, sulphur dioxide, nitrogen dioxide and particulate matter in ambient air may be elevated as a consequence of vehicle, industrial and domestic emissions.

Whist the state of the environment may be affected through pollution, it does not necessarily follow that people will be exposed. Factors such as type of activity, age, place, time of day, and behaviour all play a role in determining the extent to which a particular individual might become exposed to a particular pollutant. Exposure to mixtures of chemicals in the environment is increasingly common. Certain of these may co-act to produce synergistic effects, thus levels of lung cancer are particularly high amongst uranium miners who are also smokers. Examples of environmental exposure indicators include personal measurements of exposure to particulate matter, the proportion of children with elevated blood lead levels and the proportion of the population living in poor quality housing. Following exposure, health effects may occur immediately (acute) or may take many years to manifest. A number of factors influence the severity of the effect, including, for example, the exposure dose and duration of exposure, individual nutritional status and so on. The foetus and children, due to their size, play and development activities, and developing nature of their organs and biochemical pathways, are usually at particular risk of exposure and health effects. Action indicators may include measures of the provision of water, sanitation and housing, or the
implementation of environment and health education programmes. Environmental health indicators may be selected in relation to each of these ‘levels’ in the environment-development-health chain.

By way of example one could consider acute respiratory infections in children. In this respect relevant driving forces may include poverty, household energy policy, housing policy and agricultural policy. These driving forces may in turn give rise to environmental pressures such as cooking and space heating emissions, crowding, the growth of slums, and land degradation. The state of the environment may be affected through the development of indoor air pollution, poor housing quality and a lack or poor quality of food. Consequently, exposure to particulate matter, chilling, infectious agents and malnutrition may occur, facilitating the development of a scenario of elevated levels of acute respiratory infections (effect) (Briggs et al 1996).

8.1 SELECTION CRITERIA

Environmental health indicators need to be based on a known or suspected relationship between the environment and health. Their selection requires a comprehension of the key issues and complexities of the environment-health relationship, as well as an understanding of the broad system and intended use of the indicators.

Based on the information available in relationship to Alexandra, and the perceptions of priorities as far as the community is concerned, a preliminary set of 23 core indicators has been identified, for further discussion and refinement, and is given in Box 3.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>PROPOSED INDICATOR/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMBIENT AIR QUALITY</td>
<td>Levels of particulate matter (PM$_{10}$), sulphur dioxide, nitrogen dioxide and ozone in air. Annual noise complaints</td>
</tr>
<tr>
<td>ACCESS TO SAFE WATER</td>
<td>Proportion of households with access to sufficient quantities of safe water</td>
</tr>
<tr>
<td>DISASTER EPISODES</td>
<td>Number of homes destroyed/number of people left homeless annually by fire</td>
</tr>
<tr>
<td></td>
<td>Number of homes destroyed/number of people left homeless annually by floods</td>
</tr>
<tr>
<td>HOUSING</td>
<td>Proportion of people accommodated in informal or “unhealthy” housing</td>
</tr>
<tr>
<td>SAFETY &amp; CRIME</td>
<td>Number of children/people injured in traffic events</td>
</tr>
<tr>
<td></td>
<td>Number of cases of murder reported</td>
</tr>
<tr>
<td></td>
<td>Number of cases of rape reported</td>
</tr>
<tr>
<td></td>
<td>Number of cases of child abuse</td>
</tr>
<tr>
<td>SURFACE WATER QUALITY</td>
<td>Levels of coliforms in the Jukskei River at Alexandra</td>
</tr>
<tr>
<td>INDOOR AIR QUALITY</td>
<td>Levels of particulate matter in indoor air</td>
</tr>
<tr>
<td>SOCIO-ECONOMIC</td>
<td>Proportion of unemployed people</td>
</tr>
<tr>
<td></td>
<td>Proportion of people without functional education</td>
</tr>
<tr>
<td>FOOD QUALITY</td>
<td>Proportion of food samples not meeting guidelines in annual surveys</td>
</tr>
<tr>
<td>HEALTH</td>
<td>Number of cases of diarrhoeal disease reported at Alexandra clinics/health centres annually.</td>
</tr>
<tr>
<td></td>
<td>Number of cases of acute respiratory infections reported at Alexandra clinics/health centres annually.</td>
</tr>
<tr>
<td></td>
<td>Proportion of people who smoke</td>
</tr>
<tr>
<td></td>
<td>Proportion of people with tuberculosis</td>
</tr>
<tr>
<td></td>
<td>Childhood blood lead levels</td>
</tr>
<tr>
<td>PUBLIC PERCEPTIONS</td>
<td>Public perceptions of the state of the environment in Alexandra.</td>
</tr>
<tr>
<td></td>
<td>Public perceptions of the prevalence of threats to health in Alexandra.</td>
</tr>
<tr>
<td></td>
<td>Levels of awareness amongst Alexandra residents of the links between the environment and health.</td>
</tr>
</tbody>
</table>
9. CONCLUSIONS/RECOMMENDATIONS

Planning and development departments have enormous power to determine, in both the short and longer term, levels of environmental quality and associated public health status. A drive or walk through the streets of Alexandra provides powerful support for the old adage that “prevention is better (and cheaper) than cure”. Decades of bad planning and development decisions in the context of apartheid have left a legacy of environmental degradation and hazards to health and safety, which local authorities and other stakeholders are now battling to address. In addition, this report presents data and information from a variety of sources that depict a wide range of environment and health risks posed to the Alexandra community.

The quality of the living environment is well recognized to be a powerful determinant of community health status. Settlement planning and upgrading efforts, if environment and health benefits are to be optimised, require holistic approaches and integrated input from a wide range of sectors and stakeholders, as well as investment from the state. Settlement upgrading initiatives are costly. To ensure that investments are directed towards interventions of high yield in terms of environmental quality and health, it is important that decisions are based on sound research and information, and that impacts are evaluated. In this regard, communities can play an important role.

This report was collated with a view to the development of environment and health baselines, against which the future environmental health impact of current and planned improvement initiatives in Alexandra might be measured. Based on the information presented here, and that gleaned during interviews with key stakeholders, a set of 23 core environment and health indicators have been identified. It is proposed that information related to these indicators, or a subsequently decided final set, be collated, and analysed for discussion and dissemination on a regular basis. A neglected, yet cost-effective and powerful component of settlement upgrade initiatives, is the improvement of community knowledge of the relationship between the environmental conditions and exposures, and community health and well-being. During recent years, this aspect has been receiving increasing attention from international organizations such as the World Bank and the World Health Organisation. In this regard, the selection and implementation of a system of environment and health indicators, and the analysis and appropriate presentation of the data is likely to be a highly useful tool.
REFERENCES AND FURTHER SOURCES OF INFORMATION


EMLC. Data from the monitoring of the Jukskei River, Johannesburg, 2000.


LGMB. The sustainability indicators research project: Indicators for Local Agenda 21 – A summary.


Raymer P.B. An Investigation into urban renewal in Alexandra with specific reference to housing. Dissertation submitted to the Department of Building Sciences of the University of the Witwatersrand, in partial fulfilment for the degree of Bachelor of Science in Building, 1989.


Sarakinsky M. From "freehold township" to "model township" - a political history of Alexandra: 1905-1983. Dissertation submitted to the Faculty of Arts of the University of the Witwatersrand, in partial fulfilment for the degree of Bachelor of Arts with Honours in Development Studies, 1984.


STATE OF THE ENVIRONMENT & HEALTH IN ALEXANDRA


APPENDIX A
SUMMARY OF THE RESEARCH PROCESS

1. The project commenced with the identification of key stakeholder organisations and possible sources of information. Two key approaches were adopted in this regard. Firstly, stakeholders known to the researchers were interviewed. They were then consulted about key individuals and groups to contact. In this manner a stakeholder list was developed.

2. The project was presented to key groups including, the management committee and plenary groups of the Greater Alexandra Development Forum. This phase had two key objectives. The first was to achieve consensus on the approach to the study as well as to gain a degree of credibility. The second was, through group discussions, to boost the process of data location and procurement.

3. A community consultation workshop was held in Alexandra at which a wide spectrum of community organizations discussed their perceptions of priority environment and health concerns in the area. This opportunity was used to introduce the project to a broader cross section of the Alexandra society and to expand the process of data/information location.
4. A literature search was undertaken to identify and obtain published information on the environment and health in Alexandra. This included a search of published literature, unpublished ‘grey’ literature (e.g. socio-economic reports) & newspaper articles written about Alexandra.

5. A literature review was conducted in relation to settings similar to Alexandra to obtain relevant environment and health information.

6. A description and analysis of the social history of Alexandra was conducted as a sub-component of the study. This proved to be very useful and offered a unique insight into the historical events that influenced the current state of the environment and health in Alexandra. The main sources of data for this purpose were reports submitted for the fulfilment of masters and doctoral level degrees, the print media and the World Wide Web.
7. Personal interviews were conducted with key stakeholders. Using snowball sampling, after each interview, the interviewee was asked to refer the researchers to other individual/organisations who were also interviewed. Personal interviews included face-to-face interviews as well as telephonic interviews. Detailed notes were taken at each interview.

8. Procurement of existing databases e.g. clinic statistics and the 1996 census database. The health statistics proved to be difficult to obtain because none of the health care facilities maintained statistics on ailments reported. The Eastern Metropolitan Local Council did however; keep records on reported TB cases.

9. The MRC GIS department was approached to identify particular problematic environmental health areas. For example, geographical areas were identified which lacked electricity, piped water and sanitation. These were mapped and included in the document.

10. Site visits were conducted to observe key areas of environment and health concern in Alexandra. This was conducted to get direct, personal contact so that we could expand on issues identified through secondary data analysis, census data and personal interviews.