

INTEGRATED ENVIRONMENTAL MANAGEMENT

1.1 INTRODUCTION

Integrated Environmental Management (IEM) provides the overarching philosophy for the integration of environmental management principles into decision making in South Africa. These principles are described in NEMA and embrace the SEA principles described in section 1.1.1

IEM incorporates several instruments for environmental assessment and management. These can be applied at different levels of environmental impact management. The relationship of these IEM instruments to levels in the development cycle is shown in Figure 1 below.

The aim of integrated environmental management as outlined in section 23(2)(b) of NEMA is to:

“identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimize negative impacts, maximizing benefits, and promoting compliance with the principles of environmental management set out in section 2 of NEMA”

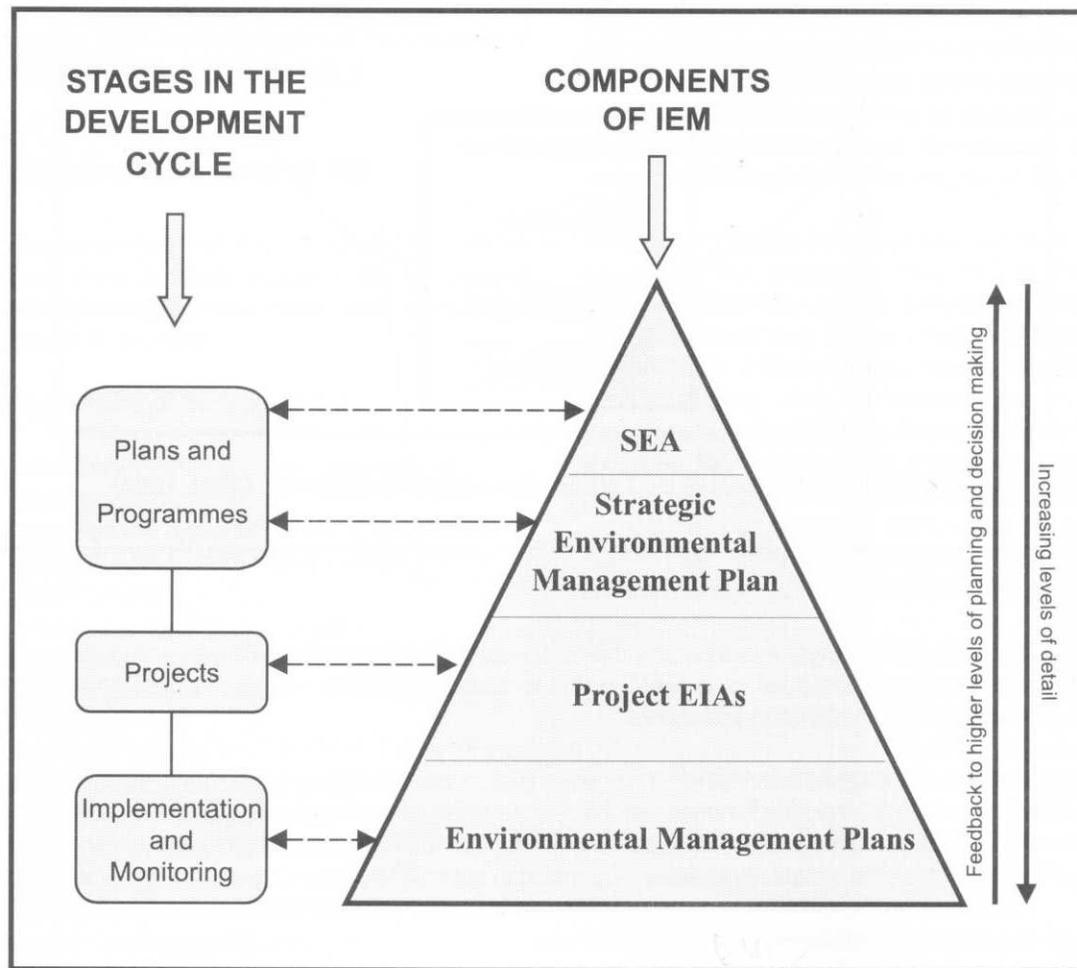
The Act infers the following objectives of the Environmental Management;

Environmental management as a process under the implementation framework, provides for the integrated consideration of human, natural and cultural environmental matters into the co-ordinated policy, implementation and monitoring and review frameworks of development plans.

Environmental management as an integral part of the planning and development process and provides for the sustainable utilisation of available resources.

Environmental management mechanisms allow for the assessment of the environmental components in terms of their inherent conservation, recreational, economic and open space value.

Figure 1: Example of a Tiered Approach to SEA and Project-Level EIA in South Africa



Source: DEAT (2000)

1.1.1 Components of Integrated Environmental Management

1.1.1.1 Strategic Environmental Assessment (SEA)

Strategic Environmental Assessment (SEA) has been identified as an appropriate instrument to incorporate environmental aspects into the higher level planning processes of a more strategic nature. It is not intended that SEA should replace Environmental Impact Assessment (EIA), but rather that it should complement project-level assessment, by providing an effective instrument for environmental assessment at the plan and programme level. SEA may form the context for lower levels of planning and provide input into higher, more strategic levels.

It is important to understand the principles involved. SEA is a relatively new process, which has been born out of the need to assess environmental issues and impacts holistically. This is not possible with the usual methods of Environmental Impact Assessment. SEA process was pioneered overseas and numerous studies have been undertaken largely in first world environments. In the South African context where rapid change is occurring resulting in major restructuring in all sectors of the environment, SEA has particular significance as it provides opportunity to build sustainability into the economy, institutions and spatial planning as restructuring proceeds.

The following is the principles of SEA in South Africa:

- 1 SEA is driven by the concept of sustainability;
- 2 SEA identifies the opportunities and constraints, which the environment places on the development of plans and programs;
- 3 SEA sets the criteria for levels of environmental quality or limits of acceptable change;
- 4 SEA is a flexible process, which is adaptable to the planning and sectoral development cycle;
- 5 SEA is a strategic process, which begins with the conceptualisation of the plan or programme;
- 6 SEA is part of a tiered approach to environmental assessment and management;
- 7 The scope of an SEA is defined within the wider context of environmental processes;
- 8 SEA is a participative process;
- 9 SEA is set within the context of alternative scenarios;
- 10 SEA includes the concepts of precaution and continuous improvement.

1.1.1.2 Strategic Environmental Management Plan (SEMP)

In terms of the National Environmental Management Act (No. 107 of 1998), these plans are to be prepared provincial and national government departments. The purpose of environmental management plans is to coordinate the environmental policies, plans and programmes and decisions of various government departments at local and provincial level, which exercise functions, which affect the environment. The aim is to minimize the duplication of procedures and provide consistency in the protection of the environment across the country as a whole.

1.1.1.3 Project Environmental Impact Assessments (EIA)

It is a detailed study of the environmental consequences of a proposed course of action. An environmental assessment or evaluation is a study of the environmental effects of a decision, project, undertaking or activity. It is most often used within an IEM planning process, as a decision support tool to compare different options.

1.1.1.4 Environmental Management Plans (EMP)

A plan, which organises and coordinates mitigation, rehabilitation and monitoring, measures in order to guide the implementation of the proposal

1.2 Principles of Sustainability

The guiding principle for development is that it should be conducted in a sustainable manner. It is, therefore, necessary to consider what the concept of sustainable development means for Mantsopa area and how these concepts could be taken forward. This is particularly important for local authorities as a result of Chapter 28 of Agenda 21, adopted at the 1992 Earth Summit in Rio, which calls on local authorities to:

“Construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish environmental policies and regulations, and assist in implementing national and sub-national (provincial) environmental policies. As the level of government closest to the people, they play a vital role in educating mobilizing and responding to the public to promote sustainable development” (UNCED, 1992)

The definition of sustainable development which has become the best known and most widely used is that of the Brundtland Commission (World Commission on Environment and Development, 1987) which defines sustainable development as:

“Development which meets the needs of the present without compromising the ability of future generations to meet their own needs”

Progress towards sustainable development requires the simultaneous achievement of the goals of social, economic, physical environmental and institutional sustainability. The achievement of sustainable development will ensure that the needs of people on a social, economic and political basis are met without compromising the natural environment. A number of key concepts are integral to sustainable development including:

Futurity: the concern for the well being of future generations.

Equity: the fairness of the distribution of costs and benefits.

Quality of life: the elements over and above material consumption, which make up human well being, including *inter alia* personal development, physical and mental health, and cultural life.

Environmental health: recognising the health and integrity of the natural environment.

Partnership: the equitable involvement of all stakeholders in decision taking and acting on environment and development initiatives.

The following principles apply:

- Development must not degrade the natural, built, social, economic and governance resources on which it is based;
- Current actions should not cause irreversible damage to natural and other resources, as this may preclude future development options;
- In cases where there is uncertainty of the impacts of an activity on the environment, caution should be exercised in favour of the environment;
- The cost of pollution should be paid by the party causing the pollution;
- The needs of land use, environment and economic planning need to be integrated;
- A development framework which promotes resource generation rather than resource degradation must be created;
- Immediate and long term actions need to be identified and planned for, to address urgent needs while still progressing towards longer term sustainable solutions;
- Resources must be utilised more effectively through each sector applying its resources to support other sectors rather than acting in an uncoordinated competitive manner.

These principles cannot be treated as universal formulae, which may be applied directly in each and every situation. The concepts must be given their own meaning in each and every situation. This is particularly true of the comparison between developed and developing countries.

In developed countries social structures and support systems including economic and political are organised in a manner that enables resources to be managed on an integrated basis. This has the potential to increase the natural carrying capacity of the land, however, the wealth that is generated brings the real danger of over exploitation of resources through excessive consumerism. It also tends to spread the national ecological footprint into developing countries. In terms of key sustainability issues, these areas have the relative luxury of being able to focus on things that have direct benefit to their physical environment.

Developing countries tend not to be as economically, socially or politically stable as their developed counterparts. The problems that developing countries face in addressing long-term sustainability are very different. The priority for environmental management within developing countries lies with the social and economic environment. Once these are functioning on a sustainable basis they will have greater means to achieve physical environmental goals since poverty is responsible for larger impacts on the natural environment than any other process or activity. People need to be elevated above the subsistence level in order that they can have the luxury of choice in terms of how they live. It is, however, essential that the physical environment is not irreversibly damaged through economic or social upliftment.

This was underlined by E. Barbier in "The Concept of Sustainable Economic Development" *Environmental Conservation*. Vol. 14 (No.2) 1987, who states

"The concept of sustainable economic development as applied to the Third World... is therefore directly concerned with increasing the material standard of living of the poor at the "grassroots" level, which can be quantitatively measured in terms of increased food, real income, educational services, health care, sanitation and water supply, emergency stocks of food and cash, etc., and only indirectly concerned with economic growth at the aggregate, commonly national, level. In general terms, the primary objective is reducing the absolute poverty of the world's poor through providing lasting and secure livelihoods that minimize resource depletion, environmental degradation, cultural disruption and social instability."

South Africa represents the sustainable development dichotomy between the developed and developing world. The country is technologically advanced and has relatively stable economic and political structures, which are supported by well-developed infrastructure. Yet the majority of the country's population are either rural based and are supported by subsistence agriculture or have migrated to the cities in search of work and live in urban poverty.

The economic status of the majority of South Africa's population has created the greatest threat to the country's social development. Urban poverty has resulted in criminality becoming an integral part of the economic order. Crime at the magnitude experienced in South Africa undermines community confidence and the social order and disables business and consequently economic development. Left unchecked, the situation will result in further economic deterioration and in turn a lowering of living standards and greater impact on natural resources.

1.3 Current Reality

1.3.1 Locality and the Study Area

The bigger study area comprises the Free State Region 173. Mantsopa is located east of Mangaung and borders Lesotho. It forms part of the Motheo District Municipal area and comprises of the previous areas of jurisdiction: Tweespruit Transitional Local Council (TLC), Ladybrand TLC, Hobhouse TLC, Excelsior TLC, Thaba Patchoa TLC and Maluti Transitional Rural Council. According to the Statistical Services of South Africa 1996 there is only two non-urban areas mentioned in the Mantsopa jurisdiction area namely Excelsior non-urban and Ladybrand non-urban. All five of the towns' rural areas are classified under these two mentioned non-urban areas for the purpose of the document. The description of each area is as follows:

Ladybrand is a town situated in the eastern Free State along the northwestern border of Lesotho. It is 138 km east of Bloemfontein and 14 km north of Maseru. Ladybrand is the most progressive and largest of all towns in the Mantsopa Local Municipal area.

Hobhouse is located southwest of the Leeu River and in the north-eastern corner of the Gorraskop border. Its landscape is characterised by sparse grasslands, typical of the Free State highveld. The area is 1 889 ha, a few hectares are rented out to commercial farmers while 1 088 ha are used for grazing by Dipelaneng farmers.

Tweespruit is situated in the southeastern Free State, 90 km east of Bloemfontein and 20 km east of Thaba Nchu, which is along the N8 route between Bloemfontein and Maseru. The size of the area is almost 4 500 ha in extent.

Excelsior is located in the southeastern Free State along the R703. The size of the area is 1 226 ha with 243 ha that has been designed as urban area.

Thaba Patchoa was part of a farm before 1996, but is currently an area on its own and therefore forms part of Tweespruit statistics.

1.3.2 Population

The total population for the Mantsopa area, based on the census 1996 data, is shown in Table 1. This represents only 7% of the total population of Motheo. The census figures made use of the magisterial district boundaries and the rural areas of the smaller towns (non-urban areas) have been incorporated in the Ladybrand and Excelsior magisterial district areas. It is therefore not possible to show the non-urban population figures for each individual town.

- Table 1: Total Population.

Year	Excelsior	Tweespruit	Excelsior Non-urban	Hobhouse	Ladybrand	Ladybrand and Non-urban	Total
*1996	5135	4885	7291	2184	16351	12134	47980
Estimated 2001 population (annual growth rate 1,7%)	5570	5383	8034	2406	18018	13371	52782
Estimated 2007 population (annual growth rate 1,7%)	6093	5881	8778	2628	19686	14609	57675

Source: Statistics South Africa (CSS) 1996
Estimates done by SSI(2002)

1.3.3 Natural Environment

Ladybrand

Ladybrand is situated within a summer rainfall region with the average rainfall of approximately 627mm. Table Mountains and peaks with valleys and low laying topography in between characterize its topography. The Platberg series is found south and west of the study area while another series of Table Mountains and peaks are located in the northern section of the town. The cliffs and gorges of these mountains range between 18 and 25 degrees although 90-degree cliffs do occur. The highest point is 1794m above sea level which is located in the north of the town and the lowest point is at 1540m above sea level located in the east of the town.

The area is drained by means of a dendritic drainage system, which drains eastward. The drainage canals found in the north, northwest and northeast of the town are deeply eroded and present a problem of topsoil loss on a large scale. There is a scattering of small storage dams found in the area.

The geology of the area is underlain by the Elliot and Clarens formations of the Karoo Sequence with dolerite intrusions in the Elliot and Clarens formations and the more recent alluvium material in the system.

Groundwater is not commonly encountered although it is present in the low-lying areas in the vicinity of the golf course and the area in the vicinity of the stormwater canal in Manyatseng. This situation may alter depending on the rainfall of a specific season. Ladybrand extracts water directly from the Caledon River. The Cathcartdrift dam supplies Ladybrand with water when

extraction from the Caledon River is not possible. The raw water is purified at the purification works situated at Genoa, approximately 10 km southeast of Ladybrand.

Ladybrand has areas that can be described as posing a degree of hazards for township development:

- The slopes of the Table Mountain and peaks around the town with slopes exceeding 18 degrees.
- The alluvium as well as the residual mudstone has a potential for expansion due to fluctuations of moisture levels.
- There is also a possibility of the presence of disperse sands that result from the colluvium emanating from the sandstone.
- Other areas along the stream in the west of Manyatseng and those in the northeast and northwest of the town where large scale erosion has taken place and is continuing to do so.

Hobhouse

Sparse grasslands, typical of the Free State Highveldt, characterize the landscape. The sandstone koppies and cliffs create a special atmosphere those attracts visitors to the eastern Free State. The Leeu River runs on the southwestern edge of the town.

The area lies between 1450 (in the southwest at the Leeu River) & 1880 m above sea level (the border of the area with Gorraskop in the north eastern corner). Hobhouse falls within the summer rainfall area with an average annual rainfall of 636mm. The area has a moderate to cool climate with low average temperature.

Tweespruit

Tweespruit is also situated within the summer rainfall region with an annual rainfall of approximately 623mm. The town is located on a relatively flat landscape devoid of mountains and hills. The area is drained by a series of streams and channels in a northeasterly direction.

The area is underlain by mud rocks of the Adelaide sub-group (Beaufort Group and Karoo Series). The soil profile comprises a thin layer of transported material overlaying residual mud rock with mud bedrock at depth.

Groundwater is present in the low laying areas, which used to supply sufficient water for the town. Tweespruit extracts water from a private farm dam (Lovedale Dam) about 9 km south of the town on the road to Thaba Patchoa in order to supplement the borehole supplies. The raw water is purified at the purification works situated in Dawiesville southeast of Tweespruit.

Tweespruit has a very limited commonage of 4500ha of which 285ha is located on a farm Giel de Wet that is approximately 12km from town and cannot be effectively used. The present commonage has been developed fully except for the flood zones and other undevelopable areas. Tweespruit has areas that can be described as posing a degree of hazard for township development. They are:

- The alluvium as well as the residual mudstone has a potential for expansion due to fluctuations of moisture levels.
- There areas along the stream in the north of Borwa and those in the east and northwest of Dawiesville where large-scale marshlands are found.
- Areas below the 1:50 year floodline.

Thaba Patchoa

The town is situated in the summer rainfall region with an average rainfall of 559mm per year. The overall area slopes from high lying areas in the west, Thaba Patchoa Mountain to the low-lying area in the east towards Armenia Dam. Smaller dams also occur in the south and west and the Leeu River runs east of the town to feed Armenia Dam.

The town has a system of seven boreholes situated in and around the city. Only three of the boreholes are being used due to high pollution levels affecting the other four boreholes. The groundwater level as measured from the existing boreholes varies between 12.5m to 32m below surface. Thaba-Patchoa also purifies water from the Armenia dam.

Thaba Patchoa has areas that can be described as posing a degree of hazard for township development. They are:

- The alluvium as well as residual mudstone has a potential for expansion due to fluctuations of moisture levels.
- There are areas along the stream in the east of Thaba Patchoa where erosion has taken place and is continuing to do so.
- Areas below the 1:50 year floodline.

Excelsior

Flat grasslands, typical of the Free State highveld, characterize the landscape. Excelsior is also situated within the summer rainfall region. The town is located on a relatively flat landscape devoid of mountains and hills. The koppie Bela-bela is also within the municipal area. The Lilana Spruit, vlei and Bloemwater provide water to town.

1.3.4 Civil Infrastructure

The following table indicates the various service providers for each town within the Mantsopa Municipal Area of jurisdiction.

- Table 2: Service Providers of Mantsopa.

Service delivered	Ladybrand	Hobhouse	Tweespruit	Excelsior	Thaba Patchoa
Water	Municipality	Municipality and Dwarf	Municipality	Municipality and Bloemwater	Municipality
Sanitation	Municipality				
Electricity	<u>Former town:</u> Municipality <u>Manyatseng:</u> ESKOM <u>Mauersnek:</u> Municipality	<u>Former town:</u> ESKOM <u>Dipelaneng:</u> ESKOM	<u>Former town:</u> Municipality <u>Borwa:</u> ESKOM <u>Dawiesville:</u> Municipality	<u>Former town:</u> Municipality <u>Mahlatswetsa:</u> ESKOM	ESKOM
Road network	Municipality and DTPW				
Health care	Municipality				
Safety and security	South African Police Services				
Labour advice	Provincial Department of Labour				
Environmental conservation	Provincial Department of Environmental Affairs				
Tourism promotion	Maluti tourist route				
Housing subsidies	Municipality				

Agriculture advice	Provincial Department of Agriculture
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Source: Local Municipality of Mantsopa

Ladybrand

Water: Ladybrand extracts water directly from the Caledon River. The storage dam in the Cathcartsdrift spruit can be filled with the natural runoff in the river or can be filled from the Caledon River. The Cathcartsdrift dam supplies Ladybrand with water when extraction from the Caledon River is not possible. All formal erven in Ladybrand and Manyatseng has water connections. There is a need to improve water provision in town especially in Manyatseng where certain high-lying areas are affected by low-pressure or do not get water during peak times. Informal erven is serviced with standpipes. A large number of the erven is not yet metered.

Sanitation: *Ladybrand* and Mauersnek have 100% waterborne sewerage system in place. Manyatseng has 30% waterborne sewerage system in place. It is proposed that waterborne sewerage be expanded to other households in Manyatseng in future and due to the expected increase in the volume of sewage, the current oxidation ponds needs to be upgraded to a conventional sludge-activated system. The Department of Water Affairs and Forestry has already expressed their concern about the possibility of contamination of the Cathcartsdrift dam. A project has been proposed in the IDP to address this issue.

Waste Disposal: The Municipality uses the current landfill site at *Ladybrand* Crushers. This site is almost full and needs to be rehabilitated soon. A new waste disposal site is presently in the process of being established in the vicinity of the sewerage disposal works. An operator is permanently based on site to work the waste into trenches. Medical waste is disposed of at the hospital via an incinerator. All the surrounding towns dispose of medical waste via the burning of it in a container and the ashes are then transported to the Ladybrand hospital where it is disposed of.

Roads and Stormwater: The tar roads in *Ladybrand* need to be resurfaced urgently while the gravel roads can be surfaced in future. The roads in Manyatseng are in a bad condition as most of it is only graded. Stormwater needs to be provided in Manyatseng to improve the maintenance of the road network while the ring road must be paved in total to improve access to the area.

Electricity: Eskom is the direct electricity supplier for Manyatseng, which in turns supply the local businesses and residents in Manyatseng. Mantsopa Municipality distributes electricity to *Ladybrand* town and Mauersnek and also certain surrounding farms.

The incoming supply line to the Eskom distribution station is a 88kv supply from where it taps down to 11kv for distribution to Mantsopa Municipality. Ladybrand town has 21 substations in town and 2 in Mauersnek while 13 substations are situated on the surrounding farms. Currently, only 2 main 11kv cables supplies Ladybrand town, which is on maximum load. A third ring is presently in the process of being installed which will distribute the load Most of the substations in town are on maximum load during winter times and additional minisubs need to be installed in certain areas. Streetlights have been installed at the entrance to Manyatseng and in Voortrekker street from New street to entrance to Mauersnek. These are maintained by Mantsopa Local Municipality.

Hobhouse

Water: Hobhouse subtracts water directly from the Leeuw-river via pumps to water purifications works. After purification, the water is pump via two 150mm pipelines to the reservoirs that supply the town and Dipelaneng. If water cannot be subtracted from Leeuw-river, a canal from the Department of Water Affairs is available. Hobhouse has no boreholes available.

Sanitation: *Hobhouse* makes use of flush toilets via a conservancy tank system while Dipelaneng makes use of a bucket service. V.I.P toilets are being planned for future use, which will improve the health risks associated with the bucket service. A bucket wash facility is situated between Dipelaneng and Hobhouse on the road to Ladybrand, close to the existing cemetery.

The conservancy tanks in Hobhouse town are pumped when full while the buckets in Dipelaneng are removed once a week. The sewage is dumped in the oxidation ponds and its capacity will have to be enlarged should waterborne sanitation be provided to the town and Dipelaneng.

Waste Disposal: *Hobhouse* has only one solid waste disposal site situated in Dipelaneng. The landfill site has sufficient capacity. No medical or toxic waste is disposed of locally.

Roads and Stormwater: *Dipelaneng* has got only gravel roads, which is currently being upgraded by contractors. This project also incorporates the upgrading of stormwater in the area.

Electricity: Eskom supplies *Hobhouse* town and Dipelaneng via a 11kv overhead supply to the substations in place. Prepaid meters have been installed in Dipelaneng while Hobhouse utilizes conventional meters. The Mantsopa Local Municipality is responsible for the maintenance on streetlights and area lights, which is done on a regular basis.

Tweespruit

Water: *Tweespruit* makes use of four boreholes. Tweespruit extracts water from a private farm dam (Lovedale Dam) about 9 km south of the town on the road to Thaba-Patchoa in order to supplement the borehole supplies. The raw water is purified at the purification works situated in Dawiesville south-east of Tweespruit. The purified water is pumped from the water treatment works to the low-level reservoirs and from here to the high-level reservoirs before it is distributed to the end user.

Sanitation: All erven in *Tweespruit* and with the exception of 23 in Dawiesville are connected to a waterborne sewerage disposal system. The sewage effluent is disposed of at the oxidation ponds. The ponds are adequate for the present demand but should Borwa be connected to a waterborne system, these ponds will be inadequate. The whole of Borwa is using buckets, and V.I.P toilets will replace the buckets in future. The bucket wash facility is currently situated next to the oxidation ponds. In Tweespruit there are 20 conservancy tanks and in Borwa 21 which have to be serviced on a regular basis. The five railway houses also make use of a conservancy tank system.

Waste Disposal: There is a combined solid waste disposal site for *Tweespruit* and *Thaba Patchoa* in Tweespruit. The site has sufficient capacity and a maintenance program is in place. No medical or toxic waste is disposed of locally. The present site is not formalised

Roads and Stormwater: The tarred roads in *Tweespruit* need resealing urgently. Borwa has only gravelled roads, which need proper maintenance. Stormwater is a problem in certain areas and needs attention.

Electricity: Eskom supplies *Tweespruit* town with a 11kv lines to the main substation. The substation is presently being upgraded as was proposed in the 2002/2003 IDP. The electricity demand from the milling and silo complex will be accommodated with this project. Eskom supplies Borwa with power via pre-paid meters.

Mantsopa Local Municipality is responsible for the electricity supply to Dawiesville, which is distributed via a pre-paid system. The municipality is also responsible for regular maintenance on streetlights and area lights.

Excelsior

Water: *Excelsior* extracts water from Linana-spruit via pumps to the water purification works and from here to reservoirs in Excelsior and Mahlatswetsa. Bloemwater supplies water to purification plant if the Linana-spruit is dry.

Sanitation: *Excelsior* town makes use of flush toilets via a conservancy tanks system that are pumped when full. Mahlatswetsa has got a bucket removal system in place and the new 300 erven will also be serviced with the same system. The bucket wash facility is currently situated next to the oxidation ponds. These oxidation dams will have to be enlarged to accommodate the additional effluent should a waterborne system be put in place in the town and Mahlatswetsa.

Waste Disposal: There is only one disposal site in *Excelsior*. The current site has sufficient capacity and a maintenance program is in place. No medical or toxic waste is disposed of locally.

Roads and Stormwater: The gravel roads in *Excelsior* are in good condition but the tar roads need to be resurfaced. Stormwater needs attention in *Excelsior*. Mahlatswetsa has mainly gravelled roads that require monthly maintenance. The stormwater system needs to be maintained on a regular basis. Mahlatswetsa entrance road is currently under construction and will be build with pavers.

Electricity: Mantsopa Municipality provides electricity to *Excelsior* town with 11kv overhead lines to 12 transformers. ESKOM provides electricity to Mahlatswetsa and distributes electricity supply through pre-paid meters. The main substation needs to be upgraded, as equipment is outdated. A project is proposed in the IDP to address this issue.

Maintenance on streetlights is done on a monthly basis by the municipality.

Thaba Patchoa

Water: *Thaba Patchoa* makes use of seven boreholes to supply town but one borehole recently dried up. Water is pumped from these boreholes to purification works via pipelines and clean water is distributed to the town. Water is also pumped from Armenia dam to water purification plant.

Sanitation: *Thaba Patchoa* has a 100% waterborne system with oxidation dams that are big enough for the demand.

Waste Disposal: There is a combined solid waste disposal site for *Tweespruit* and *Thaba Patchoa* in Tweespruit. The site has sufficient capacity and a maintenance program is in place. No medical or toxic waste is disposed of locally. The present site is not formalized.

Roads and Stormwater: There are no surfaced roads in *Thaba Patchoa* and the gravelled streets are in a good condition. These should however be maintained on a regular basis to ensure proper access to the area.

Electricity: ESKOM supplies electricity to *Thaba Patchoa* via a 11kv overhead power lines to the sub-stations. From here it distributes electricity via transformers to the town. Regular maintenance is done on streetlights in town and it is proposed that these streetlights be expanded in future.

1.3.5 Rural Areas

The RDP criteria for water provision are that every citizen should have at least 25 litres of potable water per day within a distance of 200m. The RDP criteria for sanitation provision are that every household should have at least a ventilated pit latrine.

The RDP criteria for electricity are that every household should have a electrical connection or a source of heat (like gas), to be able to cook. It is assumed that a substantial number of farms are below these RDP standards.

There is currently no information available concerning service delivery in the rural areas. The community of each town is busy to complete questionnaires that will be processed and incorporated in the final status quo report.

The provision of basic water, sanitation, and electricity for farming communities was traditionally addressed individually by farmers themselves. This led to different levels of services for different farms. As a result of the above mentioned, the level of services can only be analyzed in accordance with RDP standards.

1.3.6 Tourism Potential

Mantsopa is situated in one of the most scenic regions of South Africa, the picturesque Eastern Free State with a great tourism potential.

1.3.7 Economic Aspects

Rural Areas: The agricultural sector makes the largest contribution to the GGP and therefore the rural areas dominate the labour market of the districts spatial economy. The eastern Free State can be described as one of the most fertile agricultural regions within the Free State with a high cross income per hectare and a production capacity well above average for that of the Free State.

Ladybrand: The most dominant activities in town are agriculture and the commercial sector, which are located in the central business district of the town. The commercial sector mainly consists of the provision to the agricultural community in the rural areas where a number of businesses are found. Ladybrand has a number of light industries located in town, which are applying the local market. These activities provide mainly to the agricultural sector and to a limited extend the mining sector. There is a total of 25 industrial sites located at the western end of town, alongside the railway station and east of Mauersnek. Ladybrand is situated in one of the most scenic regions of South Africa, the picturesque Eastern Free State with a great tourism potential.

Tweespruit: The most dominant activities in town are agriculture and the commercial sector, which are located in the central business district of the town. The commercial sector mainly consists of the provision to the agricultural community in the rural areas where a number of businesses are found. Tweespruit has only one industry the OVK located in town, which is supplying the local market. Their activities provide services mainly to the agricultural sector. There is a total of 18 industrial sites found in the town at the southern end of the town, across the railway station. A piggery is situated near Borwa. This piggery is currently a problem for the community in terms of health aspects, bad smell etc.

Hobhouse: The town has lost its function as the economic hub of the area. Most residents prefer to do their business in Ladybrand, Thaba Nchu or Bloemfontein.

Thaba Patchoa: The most dominant economic activity in town is agriculture. There is no commercial or industrial sector in place. Business hive is currently in an advance state of planning

Excelsior: The town has lost its role as the agricultural economic node due to liberalization of the marketing system and improved technology. Most residents prefer to do their business in Thaba Nchu and Bloemfontein. There are no factories, wholesalers or mineral resources in Excelsior. This has a negative impact on the local economic of the town as well as work opportunities.

1.3.8 Cultural Resources

Some of the cultural resources in Mantsopa include:

- The Catholic Church-owned Mission at Modderpoort where there is a famous cave called "Kgalong La Mantsopa". Also the archaeological sites within the Ladybrand commonage boundaries. It is known as the Rose Cottage and is situated to the south east of the town.
- At Modderpoort, the Brotherhood of St Augustine has established a Cave Church in 1897 that receives scores of pilgrims annually.
- The slopes of the Platberg there are "stables" which were used by the Boers in 1858 during the Basotho wars to keep their horses safe.
- Ladybrand also has the highest number of sandstone buildings in the country and most of them have been declared national monuments and depicts a unique style.
- The Klaerhout Museum and the Unicom Agricultural School which were designed by Sir Herbert Baker who was also the designer of the Union Buildings in Pretoria at Tweespruit.
- The miniature church that was built in 1938 to commemorate the Great Trek centennial at Hobhouse.
- San artwork in caves along the Caledon River.

1.4 Environmental Assessment

1.4.1 Background

In this section the environmental issues are identified, described and assessed. As may be expected of an environmental system, things are interconnected. Activities and processes impact on multiple targets that have multiple environmental effects, with knock-ons and feedback's. There is no simple or single correct classification of environmental effects. The Constitution of South Africa (Act 108 of 1996) (section 24) assigns everyone the right to:

- (a) An environment that is not harmful to their health or well-being; and*
- (b) Have an environment that is protected, for the benefit of present and future generations through reasonable legislative and other measures that:*
- (i) prevent pollution and ecological degradation;*
 - (ii) promote conservation; and*
 - (iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

It is the duty of the State and the community to ensure that the above human rights are protected in the country. The environment is a functional area of concurrent National and Provincial legislative and management competence. All spheres of government and all organs of state must co-operate with, consult and support one another to achieve the above rights.

The aim of environmental management practices and processes is to preserve our scarce, natural resources such as water, land and vegetation for the generations to come and to protect the natural beauty of our environment.

1.4.2 Free State Environmental Issues

To ensure that the negative impacts of the priority environmental issues are minimized one needs to understand the relationship between the causes and the effects of these issues. This enables the formulation of strategies or alternatives for mitigation at a level where intervention is needed. Although the list is not detailed, it provides a sound understanding of the relationships between the activities that cause some of the issues and the associated affects on the environment in the Free State.

Table 3: Environmental Issues their Causes and Effects for the Free State.

ENVIRONMENTAL ISSUE	CAUSES	EFFECT
Increased levels and concentration of pollution and waste		
Air pollution	<ul style="list-style-type: none"> • Dust from gravel roads, mining and agriculture. • Veld fires. • Smog from burning of tyres, coal and wood for fuel. • Smog from burning of domestic waste. • Industrial emissions. • Odours from abattoirs. 	<ul style="list-style-type: none"> • Respiratory diseases. • Increase in Greenhouse effect. • Acid rain. • Undesirable living environments.
Air pollution caused by transport activities	<ul style="list-style-type: none"> • Lack of safe, affordable and reliable public transport. • Low standards for vehicle emissions. • Poor quality diesel. 	<ul style="list-style-type: none"> • Respiratory diseases. • Increase in Greenhouse effect. • Acid rain.
Visual pollution	<ul style="list-style-type: none"> • Erection of masts and towers. • Insensitive architecture and designs. 	<ul style="list-style-type: none"> • Spoiled environments.
Agricultural pollution	<ul style="list-style-type: none"> • Irresponsible use of fertilizers. • Lack of biodegradable pesticides. • Unhygienic work environments. • Unsustainable resource utilization. • Lack of proper farming plans and enterprises. 	<ul style="list-style-type: none"> • Loss of biodiversity. • Degradation of the ecosystem. • Health risks associated with water, air, soil and food contamination. • Soil erosion.
Pollution caused by mining and industrial discharges in soil, water and air	<ul style="list-style-type: none"> • Ineffective operations. • Lack of monitoring, control and rehabilitation. • Lack of property ownership. 	<ul style="list-style-type: none"> • Respiratory diseases. • Increase in Greenhouse effect. • Acid rain. • Toxification. • Contamination and sedimentation of land and water sources.
Pollution caused by mining and industrial non-hazardous waste	<ul style="list-style-type: none"> • Lack of appropriate facilities. • Ineffective operations. • Lack of monitoring, control and rehabilitation. 	<ul style="list-style-type: none"> • Health risks. • Loss of biodiversity. • Toxification.

ENVIRONMENTAL ISSUE	CAUSES	EFFECT
handling		
Pollution caused by hazardous waste (including medical waste)	<ul style="list-style-type: none"> • Lack of appropriate facilities. • Ineffective operations. • Lack of monitoring and control. 	<ul style="list-style-type: none"> • Health risks. • Loss of biodiversity. • Toxicification.
Pollution caused by untreated sewage in urban areas	<ul style="list-style-type: none"> • Network overflow through increased densities and bad management. • No formal disposal system (Many households still make use of pit latrines and the bucket system). • Treatment plant too small. • Poor maintenance. 	<ul style="list-style-type: none"> • Health risks. • Water pollution • Loss of biodiversity. • Toxicification
Pollution caused by uncollected domestic waste in urban areas	<ul style="list-style-type: none"> • Waste management not efficient in some areas. • Poor access to waste/dumping sites. • Lack of waste management. • Lack of knowledge. 	<ul style="list-style-type: none"> • Loss of biodiversity. • Degradation of the ecosystem. • Health risks associated with water, air, soil and food contamination.
Rapid urbanization and migration patterns		
Human settlements far from economic opportunities	<ul style="list-style-type: none"> • Little sustainable land available close to economic opportunities for human settlement development. • Poor settlement planning. • Natural and artificial barriers. • Many areas are suitable for agricultural purposes. • Poor infrastructure for public transport. 	<ul style="list-style-type: none"> • Time wasted on travelling. • Expensive. • Increase in vehicle movement – pollution. • Unemployment and poverty. • Increase in informal settlements.
Distorted settlement patterns	<ul style="list-style-type: none"> • Striving for social and economic improvement. • Neglect of rural areas. • Apartheid planning. • Unequal distribution of resources. • Too dense settlements. • Inadequate transport mechanisms. 	<ul style="list-style-type: none"> • Increased demand on resources in areas of high density – decrease in availability. • Increase in concentrated pollution and waste. • Social instability. • Uncontrolled influx. • Increased urbanization to areas with few

ENVIRONMENTAL ISSUE	CAUSES	EFFECT
Unsafe environments	<ul style="list-style-type: none"> • Isolated areas like parks or CBD at night. • Dark residential areas - lack of streetlights. • Congested places like taxi ranks. • Nightspots like taverns. • Poor planning of human settlements. • Lack of visible policing. • Uninhabitable spaces occupied by informal settlements. • Erosion dongas. 	<p>opportunities.</p> <ul style="list-style-type: none"> • Increase in crime and corruption. • Greater demand for security forces.
Conversion of natural habitats and introduction of alien species		
Damage to sensitive areas	<ul style="list-style-type: none"> • Unsustainable utilization of natural resources. • Increase in alien species. • Lack of alternatives. • Environmental costs not accounted for. • Inappropriate technologies. • Increase in pollution and waste. • Lack of legislation enforcement. • Denuded areas. • Encroaching of urban areas. • Injudicious veld fires. 	<ul style="list-style-type: none"> • Decrease in biodiversity. • Reduction of the ability to cope with demand. • Decrease in the carrying capacity. • Increase in erosion.
Increased demand and lack of access to resources		
Limited access to natural resources	<ul style="list-style-type: none"> • Unsustainable social and economic practices. • Population growth and increased demand. • Increased consumption following improved technology. • Limited access to communal areas. 	<ul style="list-style-type: none"> • Over-exploitation of certain natural resources. • Depletion of natural resource base. • Increased in soil erosion. • Increased levels of pollution and waste. • Draining of wetlands.

ENVIRONMENTAL ISSUE	CAUSES	EFFECT
Limited access to non-natural livelihood alternatives	<ul style="list-style-type: none"> • Illiteracy. • Lack of skills. • Limited access to information. • Lack of access to capital or funds. • Retrenchments. • Lack of entrepreneurial culture. • Lack of proper housing and services. 	<ul style="list-style-type: none"> • Increased dependency on natural resources. • Damage to natural environment.
Impact of HIV/AIDS and Poverty	<ul style="list-style-type: none"> • Inequality. • Ignorance. • Illiteracy. • Poverty. • Unemployment. • Low moral standards and peer group pressure. • Migrant labour. 	<ul style="list-style-type: none"> • Increase in mortality rate. • Social instability. • Increase in the number of orphans. • Negative impact on economy. • Demand for more cemeteries and social amenities. • Malnutrition. • Dependence on natural resources.
Unsustainable resource use patterns		
Lack of knowledge around environment	<ul style="list-style-type: none"> • Environment not part of the curriculum. • Balance between survival and conservation. • Limited information available to communities. • No further training to improve old practices. • Lack of sharing of information for monitoring and evaluation. 	<ul style="list-style-type: none"> • Increase in consumption. • Decrease in biodiversity. • Reduction of the ability to cope with demand. • Decrease in the carrying capacity. • Increase in erosion. • Duplication and inconsistency around environmental management.
Unsafe work environment	<ul style="list-style-type: none"> • Lack of enforcement of Occupational Health and Safety legislation. 	<ul style="list-style-type: none"> • Reduction in household income. • Dependency on social grants.

Source: Environmental Implementation Plan for the Free State 2001.

Table 3 serves as a summary of environmental issues occurring within the Free State area of jurisdiction indicating also the causes and effects of the issues. During the assessment of the environmental issues it became clear that limited data is currently available to monitor the impacts associated with these issues. This has some implications to the process, as the impact of the EMP to manage/mitigate these critical environmental issues cannot be measured. The need was thus identified for the compilation of the State of the Environment Report. This report will have to include indicators that will enable monitoring of these environmental issues.

1.4.3 Mantsopa Environmental Issues

Various participants from the Mantsopa Local Council were given environmental questionnaires to complete. From these questionnaires and the environmental issues for the Free State as identified through the Environmental Implementation Plan a comprehensive list of issues was compiled.

A decision was taken to prioritize the issues for the urban and also for the rural areas combined and to come up with the top 5 issues for each. Mitigation/remedial measures for these issues are provided in section 6.6 of this report.

1.1.3.1 Urban Areas

Table 4: Top 5 Issues for Ladybrand, Hobhouse, Tweespruit, Excelsior, Thaba Patchoa and their Causes

ISSUE	CAUSE
1. Waste disposal	<ul style="list-style-type: none"> - Illegal dumping of waste; - Some areas have no facilities and no waste removal service is provided. Waste management is therefore in some areas not sufficient; - People are not motivated to keep their environment clean; - Poor access to waste/dumping sites; - Municipality do not have enough equipment; - Limited budget; - People live on slopes and within floodline areas. Litter washes down to rivers and streams; - Some people are living in areas that are not accessible by waste removal trucks; - Waste disposal sites are not fenced.
2. Water pollution	<ul style="list-style-type: none"> - Illegal dumping of waste into rivers, stormwater gutters etc; - Dirty washing water, which is thrown away in the river or street and is then washed into nearby streams when it rains. - Limited waste removal service exist in some areas; - People are not motivated and educated around environmental health; - Municipality does not have enough equipment and finances to provide the services required; - People live on slopes and riverbanks. Litter and sewerage washes down to rivers and streams; - A large number of areas still do not have water borne sewerage system. People make use of pit latrines and conservancy tanks even in floodline areas and areas with a high water table. - With heavy rainfall, the sewerage network at Ladybrand overflows, contaminating water bodies, especially the vlei (wetland) next to the Brightside suburb. The natural drainage of this vlei leads to downstream earth dams just outside of Ladybrand. - Sedimentation of rivers and streams because of erosion that is caused by overgrazing, high density of people, high frequency of veld fires, people living on the river banks and steep slopes as well as removal of vegetation; - Effluents from sewerage treatment works and industries might reach water resources. - Slaughtering of animals in an uncontrolled manner, especially in the townships;

ISSUE	CAUSE
	<ul style="list-style-type: none"> - Urban agriculture; - Waste disposal sites that are not fenced.
3. Urbanization	<ul style="list-style-type: none"> - Search of a better livelihood; - Job opportunities; - Informal residents to the edge of Brightside suburb in Ladybrand are located within the floodline drainage of the boarded wetland.
4. Air pollution	<ul style="list-style-type: none"> - Lack of electricity; - Affordability of electricity; - Burning of coal and wood as an energy source; - Veld fires; - Burning of domestic waste; - Low standards for vehicle emissions; - Industrial emissions to a low degree; - Piggery at Tweespruit is currently the source of bad smells to the adjacent neighbourhood of Borwa; - People not educated or motivated around the issue.
5. Overgrazing and Erosion	<ul style="list-style-type: none"> - People live on steep slopes, riverbanks and floodline areas because of the lack of space for residential extension. - High population density; - High frequency of fires; - Urban agricultural activities; - Poor land management practices; - Vegetation removal on erven as well as removal of vegetation from riverbanks and steep slopes; - Unsustainable utilization of vegetation as a fuel source; - Lack of legislation enforcement; - Environmental costs not accounted for. Rehabilitation of the environment almost non-existent. - Overexploitation of plants with medicinal value; - Poor or lack of affective stormwater systems.

Source: SSI (2002)

1.1.3.2 Rural Areas

- Table 5: Top 5 Issues for the Rural (farm) Areas within Mantsopa and their Causes

ISSUE	CAUSE
1. Loss of Biodiversity	<ul style="list-style-type: none"> - Unsustainable agricultural practices; - Agricultural pollution; - Overgrazing; - High frequency of veld fires; - Introduction of alien species; - Lack of legislation enforcement; - Unsustainable use of natural resources; - Overexploitation of plants with medicinal value; - Lack of knowledge around the environment.
2. Water pollution	<ul style="list-style-type: none"> - Illegal dumping of waste into rivers etc; - Unsustainable resource use; - Lack of proper farming plans and enterprises; - Irresponsible use of fertilizers and pesticides; - Lack of bio-degradable pesticides; - Bad waste disposal practices; - People are not motivated and educated around the environment and environmental health;

ISSUE	CAUSE
	<ul style="list-style-type: none"> - People live on slopes and riverbanks. Litter and sewerage washes down to rivers and streams; - A large number of areas still do not have a water borne sewerage system especially the farm workers. People make use of pit latrines and conservancy tanks sometimes in areas with high water tables and within the floodline areas; - Sedimentation of rivers and streams because of erosion that is caused by overgrazing, high frequency of field fires, people living on the river banks and steep slopes as well as removal of vegetation; - Agricultural activities on areas sensitive to erosion. - Kraals that are situated next to rivers. Runoff of the waste into the rivers; - Effluent from abattoirs;
3. Agricultural Pollution	<ul style="list-style-type: none"> - Irresponsible use of fertilizers and pesticides; - Lack of monitoring, control and rehabilitation; - Lack of biodegradable pesticides; - Animal kraals are situated near watercourses. Animal wastes can therefore runoff into water resources; - Unsustainable resource utilization; - Lack of knowledge around sustainable agriculture; - Lack of proper farming plans and enterprises; - Agricultural activities on or next to sensitive areas.
4. Air pollution	<ul style="list-style-type: none"> - Lack of electricity; - Burning of wood or coal as energy source; - Veld fires; - Poor quality diesel; - Burning of domestic waste.
5. Erosion	<ul style="list-style-type: none"> - Overgrazing; - Poor land/grazing management practices; - Drought; - Introduction of alien species; - High frequency of fires; - Agricultural activities on areas sensitive to erosion; - Vegetation removal; - Mining activities. - Lack of legislation enforcement.

Source: SSI (2002)

Although the eastern Free State is rich in natural resources, there are no serious threats to the environmental from large industries producing huge amounts of toxic waste. There are however a number of environmentally sensitive areas including all dams, rivers and wetlands.

Some of the problems affecting the area are various forms of pollution. High levels of air pollution are caused around towns by wood and coal fires, especially during the wintertime. The cutting down of trees also results in a decrease of natural filters that are not being replaced at present. Another form of pollution common in all townships, especially squatter camps, is household waste and litter of winch plastic is the most serious. Uncontrolled dumping of refuse along roads and streams pose a serious health risk to residents.

The overall management of waste dumps by the local municipality might also be a problem and both officials and the community members need to be educated in terms of refuse disposal. Another form of pollution relates to sanitation where the conventional toilet system in the rural areas, also contributes towards water pollution.

Apart from the above mentioned. Land and vegetation is being affected by overgrazing in certain areas, which cause erosion. The application of the correct farming techniques and practices is

therefore important to protect and preserve the environment. Education therefore again forms a very important link to train farmers (especially the emerging farmers) to apply healthy sustainable techniques and protect the environment.

1.4.1 Current Institutional Structures

Within local government it is often felt that there is little or no capacity to address the range of pressures that are apparent at “the coal face” of institutional management. If it is considered that issues should be addressed by local councils, this is true. There are however numerous bodies at national, provincial and local levels all of which have some capacity for specific tasks. From a local government perspective the strategy should be to build sufficient capacity to access these resources effectively rather than to try to undertake all tasks at the local level.

See table 10 for some of the environmental management functions of the following departments.

1.4.1.1 External Institutional Capacity

Current institutional bodies that have environmental responsibilities include:

1.4.1.1.1 Department of Environmental Affairs and Tourism (DEAT) (National)

DEAT are the ultimate policy making department for general environmental management and for adjudication of Environmental Impact Assessments for major projects. Their focus is on issues at a national level.

1.4.1.1.2 Department of Water Affairs and Forestry (DWAF) (National)

DWAF have major responsibilities particularly relating to the protection and management of water resources. They are split into Forestry and Water Affairs branches.

The Forestry Branch is primarily involved with development of conservation, commercial (industrial) and community forestry through policy development, regulation, facilitation and monitoring, along with the effective management of State forest timber and conservation areas.

The Water Affairs Branch are primarily involved with management and protection of water resources, the provision of water resources and control of water utilization in terms of stream flow reduction allocations. Their main tool is the recent Water Act that provides far-reaching powers in terms of enforcement and management. One of the key initiatives is the provision for the establishment of Catchment Management Agencies, which will ultimately be the responsible body for water management at a local level. These agencies will have the powers to control and charge for supply of water. The initial step towards the establishment of Catchment Management Agencies, are Catchment Management Forums.

DWAF's Directorate Community Forestry has implemented a process of provincial strategic planning supporting urban and rural development. This is to ensure that the department provides appropriate and effective services in seven core functions in each province which include, amongst others, urban and rural greening.

Urban greening includes supporting the development of urban greening strategies with municipalities and the provision of trees and seedlings to urban communities through local government. The aim is to support the development of sustainable livelihoods in urban areas and to improve the urban environment. Rural greening supports local government and other service providers in working with communities to develop sustainable livelihoods. This includes supporting the provision of trees and seedlings to rural communities for agro forestry, reclamation, soil erosion control, rural enterprise, community woodlots and other products. The

aim is to provide practical examples of the means by which trees contribute to rural socio-economic upliftment.

In implementing service provision under each of the core functions, community forestry adheres to three basic principles namely social development, economic development and environmental sustainability.

1.4.1.1.3 Department of Minerals and Energy (DME) (National)

DME is divided into three branches;

- ❖ The Mineral Development Branch's purpose is to promote the orderly and continuous mining and utilisation of mineral resource.
- ❖ The Mine Health and Safety Inspectorate's purpose is to ensure the safe mining of minerals under healthy working conditions.
- ❖ The Energy Branch's purpose is to promote the optimum development and utilisation of energy resources.

1.4.1.1.4 Department of Agriculture (DoA) (National)

DoA have a mandate to guide and support capacity building, sustainable resource use, production, trade and research in agriculture in order to maximize the contribution of the agricultural sector to economic growth, equity and social development in a sustainable manner.

Awareness of the importance of sustainable utilization of agricultural resources is actively promoted through the Land Care - South Africa initiative.

A conservation audit and inspection service allows for monitoring and enforcement of regulations. This includes taking action against persons who allow weeds or invader plants to establish on their property. The combating of such pests such as locusts is also undertaken. The Department also deals with applications for the subdivision and rezoning of agricultural land.

1.4.1.1.5 Free State Department of Tourism, Economic and Environmental Affairs (DTEEA)

The Environmental Affairs Directorate is recognised as the Provincial Environmental Authority in terms of administering the Environmental Impact Assessment (EIA) Regulations under the Environmental Conservation Act.

In addition to undertaking adjudication of EIAs the department are also responsible for strategic level planning and management. It is the responsibility of local councils to flag projects where there are likely to be environmental or social problems as well as projects where law requires EIAs. It is therefore necessary to foster a close working relationship with the department in order that legislation is enforced and to perhaps obtain advice regarding potential problem projects, which fall outside the legislation.

The Council therefore needs capacity to be able to interact effectively with this department.

1.4.1.1.6 Free State Conservation Services

Their prime role is to manage, protect and monitor the more pristine and sensitive areas of the province including a number of game reserves. They are also the custodians of much environmental research and data for the province.

In terms of environmental management within Mantsopa they are key people in terms of seeking advice regarding strategies, management issues as well as specific information relating to likely impacts (natural environment) of proposed developments.

1.4.1.1 External Non-Governmental Capacity

In addition to formal institutional capacity there are numerous Non Governmental Organizations that have established to focus on specific areas or concerns. Some of them are:

1.4.2.1.1. *Wildlife and Environment Society of Southern Africa (WESSA)*

The aim of WESSA is:

"to contribute to the Earth's vitality and diversity by:

- Promoting sound environmental values and sustainable lifestyles;
- Integrating conservation and development;
- Generating individual and community action;
- Securing the protection and wise use of natural resources;
- Serving as environmental watchdogs;
- Promoting and participating in environmental education;
- Influencing policy and decision-making;
- Adapting to changing needs.

1.4.1.2.2 *Conservancies*

A conservancy is defined as 'the voluntary co-operative environmental management of an area, by it's community and users, and in respect of which registration has been granted by the relevant provincial nature authority.

1.4.1.3.3 Internal Council Capacity

There is currently very limited-environmental management capacity within Council. Current practice is for planning and technical staff to utilise consultants input as and when necessary. This is occurring on an ad hoc basis and is used to address the most pressing issues. It should be considered as a temporary solution as it is difficult to apply coordinated strategies in these circumstances.

1.5 FUTURE DEVELOPMENT AND ENVIRONMENTAL ASSESSMENT

We are completely dependant on the natural environment for survival. It is also true that all development has some impact on the natural, economic and social environments. Therefore the way in which we go about development is critical for long-term success and survival. Sustainable development is often defined as development, which meets the essential needs of people now, but without damaging the environment so much that future generations cannot meet their needs. Priorities for sustainable development include improving opportunities and living conditions for all people, and reducing the risk of disease and impoverishment, but in a way that does not damage the environment. It is therefore important that development must be carried out in an environmentally sustainable matter.

Summary of key points around sustainability:

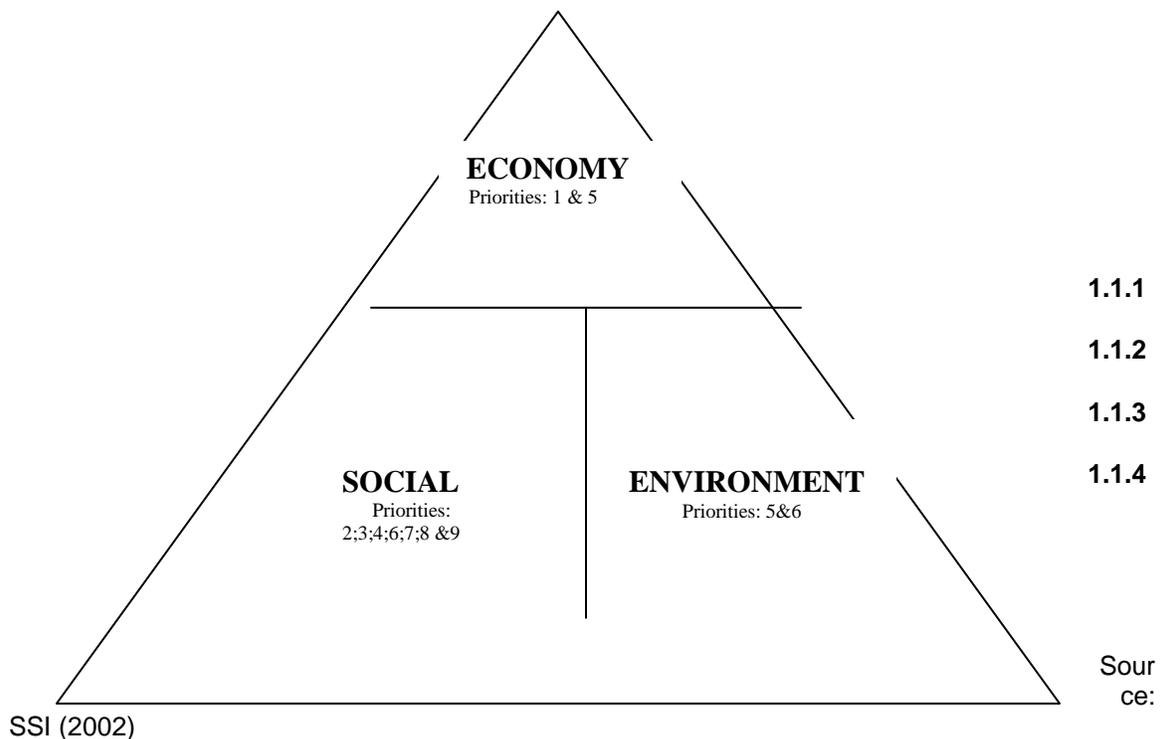
- Development encapsulates the process of growth and capacity building. It implies a mechanism of change from current status to an improved situation. Development's ultimate goal is empowerment.
- Sustainable development is an ideal situation that governments and communities should strive towards. Participatory approaches, that involve communities in all aspects of the project cycle and built capacity, are more likely to lead to sustainable outcomes than top down, technological approaches.

- Sustainable development is being articulated as a goal in many recent promulgated policy documents and legislation. However mechanisms and tools for translating policy objectives into sustainable actions have not been adequately developed and communicated to implementing agencies.
- Sustainable development embraces 4 key principles:
 - Satisfaction of basic human needs for food, shelter, water and energy;
 - Conservation of biodiversity and maintenance of ecological integrity;
 - Social justice and equity including inter-generational and intra-generational equity; and
 - Participation of individuals and communities in all activities and decisions, which affect them.
 - Sustainable development spans a range of goals including economic, social, cultural, health, political, and spiritual goals.
 - Sustainable approaches are holistic, integrated, adaptive, have a system orientation and most importantly, are participatory.

Future development plans are indicated on the spatial development framework map that was produced for every town within Mantsopa. The impact of each of these developments on the environment will be assessed and mitigation measures will be proposed. It is however important to realize that the environment is literally everything that surrounds us, and can be defined as all physical, biological, chemical, social and economic factors that affect human beings and other living things.

The priorities identified for Mantsopa can therefore be grouped in the pyramid below. This pyramid indicates the different aspects of the living environment as per definition and includes economic, social and ecological aspects.

Figure 2: Mantsopa Priorities Grouped According to the Different Aspects of the Living Environment.



The following development priorities were identified for Mantsopa Local Municipality:

1. Most of the workforce will have access to employment opportunities, economic growth and local investment will have increased while income levels and food security will be higher.
2. Access to health facilities and emergency services will have improved and HIV/AIDS prevalence will have decreased while there will be an increase in HIV/AIDS awareness.
3. Access to basic infrastructure and the maintenance of existing infrastructure will have improved.
4. Access to education facilities and the standard of education will have improved while education will be affordable to all communities. Unlimited information and support will be available to all communities.
5. Access to sufficient commonage and properly managed livestock in urban areas will have improved while land reform will have been effectively implemented.
6. Regular and affordable public transport service will be available to all communities
7. People will be living in a safe, secure and sustainable healthy environment
8. Local service agencies will have established offices in Mantsopa while Local Governance will have improved
9. Diverse and improved sport and recreation facilities will be available in each town and we will have a healthy society

It can be seen that most of the priorities identified for Mantsopa fits within the social section of the pyramid and include better employment opportunities; better access to health and education facilities and better infrastructure provision and access to information. The social section also includes better public transport services and sport and recreational facilities for the community.

The economic section includes job creation, LED and Tourism projects. The ecological section includes all projects that might have a direct impact on the physical environment and more specifically future development as discussed below and indicated on the spatial development frameworks maps in the spatial development framework report.

The following section will indicate proposed developments within each town of Mantsopa. Each development will be assessed and their impacts both negative and positive will be identified.

1.6 Implementation of Environmental Management Measures in Mantsopa

1.6.1 Objectives of Environmental Management within Mantsopa

The following is our objectives for environmental management within Mantsopa.

- ⇒ Sustainable development;
- ⇒ To address the top 5 environmental issues within Mantsopa as identified in section 4.3 of this document;
- ⇒ To mitigate the proposed future development (section 5.1 & 5.2 of this report) in order to promote sustainability, equity, futurity, quality of life, environmental health as well as partnership of all stakeholders in decision taking and acting on environment and development activities.

1.6.2 Strategies

In broad terms the current use of natural resources within some areas in the Mantsopa area is not sustainable. This is because:

- Because of the density of people and the quality of the land major soil erosion problems have developed within certain areas in the Mantsopa region. There is a danger that pressure on land will increase the degradation.

- Informal settlements have major negative impacts on water in adjacent rivers in the area. The density of development is generally so dense that formalisation of services and in particular water supply, treatment and sanitation is the only option in terms of management of impacts.
- Ecological diversity within the area has been significantly impacted on by intensive agricultural practices in some areas. The lack of adequate conservation areas and strategic ecological links is probably leading to loss of species.

1.6.2.1 Strategy 1 - Research, Protect and Monitor Strategic Resources.

Whilst promoting economic upliftment is probably the key environmental strategy without which the sustainability goal would be unachievable, it is critical that the environmental cost is kept to a minimum. In implementing policies a pragmatic approach must be adopted as it must be realised that there will be costs before stability is achieved. The environmental account must therefore be managed wisely. As with any account management there are key tools. They are:

- **Research** and the collection and analysis of information is fundamental to effective management. Research should include an assessment of assets as well as the likely implications of management actions.
- **Conservation** and protection of existing assets is critical to ensure that the building blocks for recovery of assets are maintained.
- **Rehabilitation** will improve the balance of degraded assets.
- **Monitoring programmes** provide a regular check in order that the effectiveness of management can be established and adjusted as necessary.

Policies

Develop, maintain and augment environmental information systems.

Actively conserve strategic environmental assets.

Rehabilitate strategic areas of degradation.

Establish effective monitoring environmental programmes.

1.6.2.2 Strategy 2 - Make the Most of Existing Resources and Undertake Enabling Work for Sustainability.

Short-term action needed includes the following:

- Address hot spot situations and relieve pressure on resources where possible.
- Increase confidence with regard to the effectiveness of measures.
- Undertake enabling projects that will lead to greater levels of sustainability.

In order to address these the following areas of policy need to be considered.

Education, particularly in the fields of health, land management, environment, agricultural skills, and business skills is necessary in order that people have an understanding of the benefits that can be derived from changing their approach as well as the impacts that their actions have on other people.

Enforcement works hand in hand with education, as you cannot penalise an action without first showing an alternative method of achieving or improving the desired result.

Empowerment of communities partly through education and partly through the provision of resources is probably the single most important part of the strategy. Once this is achieved there

is likely to be a receptive audience for education programmes and enforcement can to a large extent be undertaken at the community level.

Development of strategic infrastructure is needed to unlock latent potential for exploitation of resources in many areas.

Provision of affordable services to areas without adequate service provision.

Policies

Empower community organisation through education and the provision of appropriate resources.

Undertake health, agricultural, and business development throughout the area.

Establish appropriate enforcement mechanisms based on community systems.

Develop key infrastructure projects.

Encourage resource management through community organisation to provide the basic services to rural and informal areas.

1.6.3 Programme Implementation

Strategy 1 (Research, protect and monitor strategic resources) is fundamental to effective environmental management, as without current and accurate information, informed decisions cannot be made. Strategy 1 therefore appears to take high priority early on, in order to establish effective information systems. Whilst the management of information will always be important, once effective systems are established fewer resources will probably be needed on going management.

Strategy 2 (Make the most of existing resources and undertake enabling work for sustainability) is a way in which economic benefits might be achieved for rural/informal populations. The strategy will be important in order to ensure that precious resources are not wasted. It is seen as having highest priority during initial stages.

1.6.4 Institutional Management Strategies

From the institutional scan it is apparent that there is a relatively large amount of institutional capacity that is involved in various areas of environmental management within Mantsopa. The problem appears to be related to:

- The lack of cooperation and liaison between departments.
- The lack of an understanding and capacity within Council to make the most of external capacity.

In developing the Council's capacity the overriding principle must be to build on existing structures and to avoid the creation of new organisations. This approach has the dual benefit of making most efficient use of existing capacity as well as most easily gaining the 'buy in' of personnel who will be responsible for implementation.

The Council's role therefore should perhaps be one of managing existing external capacity more effectively. This does not necessarily mean that Council needs to have authority over external departments but should concentrate on providing the necessary coordination between departments and organisations and help to focus their attention on the problems of Mantsopa. The following might be typical areas of responsibility:

- ❖ Respond to applications from departments (DWAF, DME, DTEEA) for input into their approval processes and argue on Mantsopa's behalf;

- ❖ Input local requirements into approval processes;
- ❖ Highlight transgressions from approved schemes and provide relevant departments with necessary information for enforcement;
- ❖ Focus external departments attention on issues that fall within their domain but could be overlooked due to lack of local knowledge;
- ❖ Coordinate and liaise with watchdog bodies (catchment management forums, conservancies and other interested parties);
- ❖ Organise input to Mantsopa initiatives.

The report assessment also clearly illustrates that the issues involved in the achievement of the sustainability goal are multi-sectoral and are as much to do with economic development, infrastructural engineering and education as the management of the biological environment. This indicates that two institutional actions maybe necessary:

- ❖ The environmental capacity of all officers should be improved in order that there is a common understanding of the importance of projects in achieving a sustainable situation and sound management techniques are utilised.
- ❖ Because of the need to manage development across institutional departments and boundaries and to impose control at the key points in plan preparation and development approval, it appears logical to align environmental management responsibilities with planning.

Because the Council is largely under capacity to undertake their servicing and development functions and because there is no specific environmental management expertise within its structure that can coordinate external agencies in an informed manner, it appears inevitable that at least one specialist environmental management post is required.

In terms of undertaking necessary environmental management within Mantsopa, there are a number of actions that are necessary, including;

- ❖ Coordinating responses to national and provincial departments in respect of their responsibilities;
- ❖ Collecting and managing data;
- ❖ Organising local environmental parties in a manner that they can input into environmental management;
- ❖ Advise planning of environmental legislative implications of development proposals;
- ❖ Monitor Development;
- ❖ Undertake Projects (Education/Rehabilitation) probably through the resources of other agencies and departments;
- ❖ Building environmental capacity throughout Council.

Whilst all areas of action are important, it is obviously difficult when to address all areas at once. Some prioritisation is therefore needed in order that environmental management is built from a firm base. Two distinct phases of operation have been identified in terms of the necessary emphasis of actions

1.6.4.1 Establishing a Presence (2002 – 2003)

The primary aim of this phase is for Council to begin facilitating environmental management in Mantsopa by ensuring that the necessary institutional arrangements and links have been established and by starting to gather and manage data. This phase should also commence activity in order to demonstrate commitment to improving environmental quality, especially by attending to priority issues as identified earlier on in this report. In order to do this, Council will have to invest in specialist capacity. The appointment of a *Regional Environmental Manager* will be the starting point in terms of building capacity throughout Council.

In terms of the strategies outlined earlier, the following will be priorities during this phase;

- Strategy 1 Research, protect and monitor strategic resources;**
Strategy 2 Make the most of existing resources and undertake enabling work for sustainability.

Three distinct functions become apparent and require different institutional arrangements:

- ❖ Establishing institutional links and responding to provincial and national departments with respect of their requests. It is imperative that this is undertaken by the council officer who will ultimately be responsible for environmental management.
- ❖ Collecting and establishing a data management system. This will involve Information Technology expertise as well as the setting up of environmental forums. In house personnel should also play a major role in these tasks as they will establish methods of working and relationships that will form the basis of future operations.
- ❖ Starting to address burning issues such as development in inappropriate areas could possibly be undertaken by retained consultants. Necessary actions include negotiations with relevant authorities and the establishment of alternative sites and possibly the preparation of suitable management plans. If consultants were used for any of these operations, the most benefits might be derived in terms of council capacity if the appropriate council officers also played an active part.

Development managers must co-ordinate, manage and review the key projects and initiatives, and ultimately translate the plan into reality. These people will have to form a close working relationship with all council's technical expertise including the environmental manager. In terms of priorities for building environmental capacity, it is critical that the development managers have a clear overview of environmental issues, concerns and legislative requirements. On appointment, suitable training should be initiated in order that they are professionally equipped to deal with environmental issues in the field.

1.6.4.2 Getting Things Done (2003 onwards)

The purpose of this phase is to undertake key projects to promote economic development that will provide the means for sustainability in all areas. At the same time, on going management and education will be needed in order to minimise environmental costs and safeguard/rehabilitate key assets. Its focus will be on actions, and council's involvement will be that of facilitating, supporting and undertaking these actions in accordance with the plan. The environmental management component of this will be to actively coordinate and focus the capacity of external departments and agencies on project areas as well as monitoring development and performance in terms of achieving the sustainability goal.

This will require the environmental manager to provide leadership for the projects, and function as the key liaison person for environmental issues around development proposals and queries. As development increases, support for the environmental manager may be required in the form of an assistant. Close links will have to be built with community through the development managers.

1.6.5 General Mitigation Measures for Issues Identified within Mantsopa

The following section gives an indication of some mitigation measures proposed for some of the environmental issues that were identified.

1.6.5.1 Protection of Bio Diversity

Maintaining bio-diversity is a fundamental environmental planning objective as loss of species not only has an immediate impact in terms of depletion of nonrenewable resources it also affects the balance of ecosystems producing secondary impacts in terms of proliferation or reduction of linked species. Strategic criteria for maintaining bio-diversity include:

- ❖ Protection of key habitat areas;
- ❖ Protection of ecological links that will allow species to migrate as conditions change. The most important links are those along the rivers and sprouts systems.

In addition to this, areas of steep slopes should not be allowed for settlement making, mining etc to help prevent erosion in these areas.

1.6.5.2 Essential Environmental Services

In addition to conservation for the sake of maintaining bio-diversity, elements of the environment provide key functions that are beneficial to human activities. It is therefore important to understand which elements are important and the significance of their removal.

a) Erosion Protection

The topography of areas like that of Ladybrand lends itself to large-scale erosion especially as people remove vegetation from the soil in streets, footpaths and along natural waterways. Overgrazing results in bare patches of land within town. The development of housing and structures increase the runoff and causes large scale scarring of the land.

Erosion protection is critical for protection of fertile soil, which is probably the most difficult resource to replace. Soil loss through poor land management practices is greatly aggravated in the areas with a generally steep terrain. Such soil losses have resulted in silting up of catchments and rivers, with consequent degradation of these ecosystems. In order to control soil erosion in a sustainable manner the root cause of the problem must be addressed namely poverty and subsistence lifestyles.

Some form of rehabilitation should be engaged upon in the areas of concern. These areas can be used as natural conservation and green areas in towns. In addition to conservation being important purely for preservation of ecological value, it is also important in terms of the functional services that the open space and associated vegetative communities provide. This include:

- ❖ Protecting the soil from wind and water erosion;
- ❖ Provides sanctuary for various animals and protects man and buildings from extreme climatic conditions;
- ❖ Provides a source of alternative medicines;
- ❖ Maintaining ecological witness areas that are important from a scientific point of view;
- ❖ Mitigation of flood events;
- ❖ Provides visual benefits.

The most obvious functions that can be identified at the regional level include:

- ❖ Protection and conservation of functional floodplain areas in order to mitigate against flood events;
- ❖ Protection and conservation of river edge vegetation in order to protect river systems against siltation and to assist in flood attenuation;
- ❖ Protection and conservation of vegetation on steep slopes and areas of erodible soils in order to conserve soil resources.

The key to minimizing soil erosion is ensuring that areas with erodible soils and areas of steep slope are not left unvegetated or unprotected. It should be noted that in accordance with the

Conservation of Agricultural Resources Act 1983, it is illegal to cultivate slopes with a gradient in excess of 20%.

The extent of areas that are currently degraded and eroded might be used as one of the key environmental indicators for Mantsopa. If more land is available for settlement making there should be less pressure on these areas and it should be hoped that the extent of degradation would decrease.

The streets in towns, which have not been surfaced, pose a treat of soil erosion. These streets need to be constructed, surfaced with gravel and stormwater side channels to be provided. The residents need to be encouraged to plant trees, laws and shrubs in their sites in order to mitigate soil erosion.

Erosion protection is also critical to areas adjacent to rivers that are susceptible to flood events where climate change is leaving low lying and unprotected areas open to the threat of major erosion.

Vegetation plays an important role in protecting both assets;

- ❖ In terms of flood and erosion risk from rivers, well vegetated banks have the benefits of reducing silt entering the river, slowing run off entering and thus helping to mitigate flood events as well as helping to hold the stream bank in place. It is therefore wise to maintain a buffer of vegetation against all watercourses and rivers. The Conservation of Agricultural Resources Act 1983 actually makes it illegal to cultivate within 10 meters of the flood area of a watercourse.

b) Protection of Valuable Agricultural Land and Community Health

Agricultural productivity is currently an essential component of the economic environment of Mantsopa. It is also likely to be important for the long-term sustainability of the population. It is fundamental therefore that agricultural productivity is both safeguarded for future generations and that it is used as a tool to support the sustainability goal.

It has been observed that there are some residents who own livestock in towns and allow their animals to graze on the unoccupied portions of the commonage. In view of this need, community kraals are required at a safe distance from the residential areas, watercourses and away from transportation routes. All livestock must be removed from the residential areas as they pose a health and safety risk.(Council is presently in the process of obtaining a court order for the removal of all livestock from the townships and adjacent areas.)

The following is the acts that might impact on the implementation of urban agriculture. These laws are:

- ❖ Subdivision of Agricultural Act (70 of 1970);
- ❖ The Development Facilitation Act (67 of 1995);
- ❖ Water Services Act, 1997;
- ❖ Environmentally Conservation Act (73 of 1989);
- ❖ Abattoir Hygiene Act (121 of 1992);
- ❖ Town Planning Schemes;
- ❖ Local Government Transition Act, Second Amendment (97 of 1996);
- ❖ Less formal Township Establishment Act (11 of 1992);
- ❖ Health Act (63 of 1977);
- ❖ Conservation of Agricultural Resources Act (43 of 1993);
- ❖ Fencing Act (31 of 1963);

Laws governing health, hygiene, pollution and resource conservation in urban areas sets down basic standards but does not restrict urban agriculture. A number of the newer laws and policies,

such as the DFA, calls for the optimal use of land and promote economic growth, which therefore encourages urban agriculture. In implementing urban agriculture a balance will therefore have to be achieved between the promotion and control aspect to prevent aspects such as environmental degradation.

c) Water Protection

Water quality problems in poor settlements are part of a "pollution cycle", which must be broken if the health of residents of those settlements and of the environment is to be protected.

The pollution cycle in poorer settlements might look like this:

- ❖ Poverty leads to lack of payment for services, which leads to;
- ❖ A poor standard of services, which leads to;
- ❖ Poor community health and a polluted environment, which contributes to;
- ❖ More poverty because ill people are not able to earn money or go to school, which leads to;
- ❖ The same process starting all over again, but worse.

Various agencies are targeting different parts of the pollution cycle. Many obstacles need to be overcome in order to protect water sources from pollution. Settlements are complex in their organization, their effects and needs. Changes do not happen overnight, and work must be done at several different levels in order to deal with this complexity. There are three major types or causes of problems, which are all interlinked. They are:

1. Socio-economic issues

Socio-economic issues include poverty, unemployment, lack of awareness or education, habitual ways of doing things, and social attitudes. Poor and unemployed people are focused on the need to survive in the short term, and water protection is likely to be a low priority.

There is also a general lack of understanding in South Africa of the combined effects of each person's behaviour on water pollution. All people and creatures of habit need time and motivation to change.

A major obstacle to dealing with water pollution in and around settlements is the belief that government is responsible for dealing with such issues. However, our country's population is growing quickly, and local government funding is very limited and has to cover a wide range of services. As a result local authorities are struggling to deliver services efficiently to all who need them. It is therefore critical that users pay for these services to allow them to continue and improve. Services need to be chosen that have a low cost of operation and maintenance but which still protects the environment.

2. Physical issues

This relates to the practical aspects of waste control, and includes installing and maintaining the water-related infrastructure in a settlement, such as sewerage piping, stormwater drains, garbage skips and others.

3. Institutional issues

As mentioned limits on local authority funds make it difficult to deliver services to everyone, and to do so efficiently. Local authorities need to understand each settlement's unique needs, such as the best places to put waste containers (skips) so that they are convenient for residents to use, and how often they fill up and therefore how often they should be emptied.

Sometimes garbage lying next to skips is not taken away, because local authorities have to do as much as possible each day to keep their costs down, and so the pollution problem grows. This is a simple example of institutional problems, but there are many others.

Dealing with any one of the forms of waste in a settlement means engaging with all three of these types of issues. For example, littering in streets is a socio-economic problem that is best addressed by awareness and education campaigns. However, if there are no, or too few waste bins provided people cannot be expected to through rubbish away safely. This is a physical problem that can be addressed by ensuring that enough bins or skips are available in the most suitable places. But, if these bins are not emptied regularly, litter will still overflow into the streets, and the bins will no longer be used. This is an institutional problem, and will have to be dealt with by communication, and capacity building with the local authority.

This example shows that most waste problems do not have a single straightforward solution. We have to approach them from different sides at the same time, using different processes. Each waste stream will also have all types of problems.

The supply of water is another area of strategic importance in terms of long-term sustainability. Water supply can be broken down into four groups:

- ❖ **Formal domestic supply** to main residential areas. Priority needs to be given to catchments in terms of management and maintaining land uses that are compatible with maintaining water quality.
- ❖ **Informal domestic supply** to rural settlement and informal urban settlement directly from rivers has been highlighted as being important. Whilst service providers see the supply of potable water to rural and informal areas as a priority, the situation is not likely to change in the more remote and less densely populated areas. Community education and organisation will be needed in these areas to ensure that water resources are protected adequately.
- ❖ **Extraction for industry** - It might have a negative impact on the water quality because of polluted water returning to the stream.
- ❖ **Extraction for agriculture** occurs within all catchments that are within the Agricultural Zone. Extraction is coordinated and permitted by the Department of Water Affairs and Forestry.
- ❖ **Borehole supply** is a major source of water for rural households and farms. The impact of boreholes in terms of depletion of underground aquifers is not thoroughly understood and monitoring of supply quantities is necessary.

d) Protection/Management of Mining Areas

1.1.4.1.1 Mineral extraction is not a major activity within Mantsopa but is well practiced in some areas. It is obvious that the majority of operations are sand winning projects for the use in making bricks. The number of operations is a general indicator of development activity. Sand winning is generally considered to have a negative impact on river systems because of erosion and sedimentation, visual aspects and biodiversity. This is primarily due to the lack of enforcement during operation and inadequate rehabilitation on decommissioning. If managed correctly sand winning should not be detrimental.

If sand winning is to be undertaken effectively the Council will have to work with the Department of Minerals and Energy as well as the Department of Tourism, Economic and Environmental Affairs to ensure that;

- ❖ The correct areas are mined;
- ❖ Operations are undertaken in a manner that impacts least on the environment;

- ❖ Rehabilitation is adequate in terms of specification, extent of the works and period of maintenance.

e) Protection of Open Space Systems

In the past, the planning and provision of a system of open space has not been a feature of low-cost housing schemes. The lack of open space and green belts in these settlements has impoverished the life of the residents both physically and psychologically. People need areas where they can relax from the stresses of daily life. In urban areas where small patches of the natural environment still remain, these areas should be protected in a system of open spaces. Where, no natural environment remains, open spaces can be created, where indigenous vegetation can be planted and encouraged to grow.

Open areas should provide residents with places for safe recreation, and should conserve and protect the natural environment and associated small animals. Indigenous vegetation is best, as it requires less maintenance. Natural areas also treat air and water pollution, absorb rainfall, prevent flooding and soil erosion and reduce noise levels. An open space system should include a range of social areas, and can play an important role in environmental education. Open space is also needed for important cultural and religious events such as initiation and baptism ceremonies.

The following areas can be included in an open space system:

- Water bodies such as wetlands, rivers, drainage channels, lakes, ponds and springs;
- Natural vegetation around these water bodies;
- Unusual land forms like rocky outcrops;
- Areas that provide a link between natural areas of high conservation value;
- As many different environmental conditions or habitats as possible;
- Areas of cultural significance; and
- Areas of social interaction.

The ecological environment is a highly dynamic system and as situations change (climatic/human intrusion) so both plants and animals need space for migration. Ecological islands that have been cut off by land uses such as intensive agriculture and development are likely to degrade over time. Ecological linkages is therefore of great importance. River systems provide the best opportunity for strengthening the ecological linkage but are more difficult to maintain.

To allow small animal migration and seed dispersal for plants, try to set aside a corridor of open areas that runs throughout the built up area. If there are natural areas next to the site, the corridor should link up with these. Incorporate areas unsuitable for development such as rocky outcrops and steeper slopes into the open space system. This will lower the risk of unplanned expansion into these unsuitable areas. Open areas around watercourses serve as scenic and tranquil recreational areas. If a river cuts the site in two, create a corridor of open space along its length, with sufficient space between the built environment and the watercourse.

Keep in mind that open spaces that become overgrown with dense bush could provide hiding places for criminals. It is therefore important that the community participates in the maintenance and management of these open spaces. Vegetation must not block off visibility for traffic or adjacent roads.

f) Protection of the Visual Assets

Landscape changes have a direct, immediate visible effect on people's surroundings. Visual impacts can arise from a variety of sources such as changes in land use such as mineral extraction; drainage and afforestation; by development such as buildings/structures; industry; by changes in land management, such as intensification of agriculture; and by changes in industrial processes.

The significance of a visual impact is a function of the sensitivity of the affected landscape and visual receptors and the magnitude of change that they will experience. The word sensitivity incorporates the relative value of the landscape and how tolerant it is to change.

Some of the more important landscapes in terms of their natural and dramatic character and their appeal for tourism within Mantsopa include:

- ❖ Dramatic upland landscapes where the rugged topography provides a major visual attraction.

It should be noted that whilst these are probably the most important landscapes in that compromising them could severely detract from future tourism potential, the visual quality of all living and working environments is important in terms of maintaining a high quality of life for the people of Mantsopa.

Fragile mountain catchment ecosystems are considered sensitive areas in the Environmental Management and mining authorization process. Major land uses in such areas besides water catchment are indigenous forestry, recreation, nature conservation, agriculture and communal land. Both national and provincial government are responsible for legislation affecting mountain areas, and a wide range of legislation controls the development of mountain ecosystems. Also all outdoor advertising, whether on or off the developed property must comply with the South African Manual for Outdoor Advertising Control (SAMOAC).

g) Protection of Historical and Cultural Heritage Resources

Archaeological/historical work has been done in the region. The archaeological potential of the region is considerable. Any development should be preceded by an Environmental Impact Assessment, which should include an assessment of cultural resources (archaeological, historical etc.).

It would be pointless to provide detailed site location data for archaeological/historical sites in this report. Firstly, many recorded archaeological sites no longer exist. Secondly, such data is incomplete. 'Dots on a map' therefore, would provide a false impression of the archaeological/historical potential of the region. Herein lies a danger, from an archaeological/historical point of view, because developers and planners separated from this report may fail to appreciate the incomplete nature of the data. Consequently, they may inadvertently make decisions that adversely affect archaeological sites and data. What follows then is an overview of the known archaeological/historical potential of the region. The intention is to alert developers and planners to this potential.

1.6.6 Provision of Civil Infrastructure to Mitigate Causes of Environmental Pollution

Infrastructural services are an essential part of any development project and are generally supplied by the local authority. Providing appropriate services increases quality of life, reduces risk to health, and maintains or improves the balance of the natural environment.

In South Africa, high standards of services have been provided for middle to high-income communities, while low-income communities have often been denied even basic services. This has had serious negative social, health and environmental consequences. It is vital that adequate levels of services are extended to areas where it does not exist.

1.6.6.1 Priority Service Issues for Mantsopa Municipality

The following 5 priorities service issues exist for Mantsopa.

1. High level of sanitation below the RDP standard.
2. Limited access to potable water and un metered connections.
3. Danger associated with settlements in flood line areas and the improper management of storm water.
4. Lack of maintenance of infrastructure, particularly the inaccessibility of the road network and the malfunctioning of the streetlights.
5. Improper waste management.

a) Water

The RDP criteria regarding water provision are that every citizen should have at least 25 litres of potable water per day within a distance of 200 m. The local municipality however still has the responsibility and is in fact obligated in terms of the constitution to provide water (to basic needs) within areas of jurisdiction.

In most towns there is a section of the community still not having access to water in compliance with the RDP standards. There is a lack of personal, resources and finances to operate and maintain the bulk and internal water supply systems effectively. Of particular concern is the lack of control of the unaccounted water, water losses, and the un-metered consumption.

Provision of water on farms, particularly to farm workers, also requires attention. Many farm workers may now have running water at their dwellings, but is still believed that a considerable percentage do not. One can regard this as the responsibility of the landowner to meet the basic employment or tenure provisions. Some assistance should however be provided to farmers to achieve a minimum service level for all.

1.1.4.2 Apart from the above, it needs to be stated that the water demand of a region or an area closely links with the demand characteristics and in particular the sanitation requirements of that area. It would be to the benefit of the region to institute mechanisms or to formulate strategies to continuously conserve water, which will in turn minimize the need for infrastructure.

Goals:

- Water purification/metering
 - Provide cleaner and sustainable water to consumers;
 - Keep cost of water to purify to the minimum;
 - Put metering into place so that losses will be to a minimum;
 - Ensure adequate bulk capacity.
- Water distribution network/metering of all sites/resources
 - Make sure that reservoirs are safe and clean for waters storage;
 - Inspection of pipelines;
 - Check domestic connections through programs;
 - Provide every household in Mantsopa with at least a service connection on their erven;
 - All connections must be metered;
 - Bulk capacity be upgraded if required;
 - Monitoring of water pressure.

b) Electricity

The RDP-criteria for electricity are that every household should have an electrical connection or a source of heat (like gas) to be able to cook.

A large percentage of households in the area do not conform to this criterion and still do not have electricity in their homes. The slow rate of installation, the fact that very few people can afford the

connection fee and the lack of knowledge on who is providing the service are the three major problems with electricity. The biggest challenge regarding electricity is to make the connection affordable and upgrade the bulk electricity supply to a level that provides in the needs of the community.

Another important challenge is to improve people's knowledge on the safe and sustainable use of electricity and the service provider and where and how faults can be reported. This will lead to fewer people being dependent on other sources of heat such as coal and wood during winter while less air pollution and deforestation will occur in the area.

Goals:

- Electricity network/metering/losses
 - Install mass meters in all towns for identifying any losses;
 - Metering of all installation points and program for identifying any losses;
 - Servicing of high tension breakers and also the lines and cables;
 - Records can be kept of maintenance of network;
 - Keep streetlights in a good working order;
 - That areas without streetlights be services;
 - Upgrading of the bulk capacity if required.

c) Sanitation

The RDP-criteria is that every household should have at least a ventilated improved pit (VIP) latrine. A waterborne sewerage system is required, where geotechnical conditions prohibit the use of pit latrines.

Sanitation in the Mantsopa region as foremost of South Africa, remains the basic service with the greatest backlog. If the VIP system is considered the minimum standard, then a large percentage of residents in the region do not have an acceptable sanitation facility. The VIP system has been provided extensively in some towns, but in many cases these systems have major shortcomings. In many instances they have been provided in areas not suited to this system, e.g. where groundwater tables are high.

Some areas like Manyatseng still make use of the bucket system. This situation is in itself a serious problem, not only from a health point of view, but also because the operating cost of a bucket system is very high, often exceeding that of waterborne system over the long term.

Most people insist on a waterborne system as the absence thereof is regarded as one of the imbalances between communities, which in turn affect service payment levels. The installation of a water borne system is, however more than often not affordable, due to initial capital outlay and more specifically:

- The high cost involved for network installations;
- The high cost involved for the upgrading of treatment works; and
- The additional water that is required.

Although various alternative systems exist (i.e. VIP and others), they all require high capital outlays. The installation of water borne systems is, however the only long-term solution for the sanitation needs in the towns of the region.

The district council has a regional function in terms of co-ordinating of the following aspects:

- To inform and educate communities in order for them to understand the implication of sanitation and the high cost involved for installation;
- To gradually plan and phase the upgrading for sanitation systems;
- To fund the upgrading of sanitation requirements;
- To investigate the affordability levels within communities;
- To investigate and determine if the water supply will be sufficient; and
- To revisit the existing government policies regarding sanitation standards.

The solution for the rural areas, and the farms is often restricted by the unavailability of water. The specific solutions would normally have to provide in-situ treatment of sewerage (VIP or septic tank), and low or zero water use. One can regard this as the responsibility of the landowner to meet the basic employment or tenure provisions. Some assistance should however be provided to farmers to achieve a minimum service level for all.

Sewage treatment in the urban areas is the responsibility of the local municipality. Most towns have some form of sewerage treatment works, generally in compliance with statutory requirements. Many facilities require upgrading, general maintenance and refurbishment, as well as extension to meet the increased loadings. Further capital investment is therefore required. Many of the towns lack the personnel, resources and finances to operate and maintain the sanitation system effectively.

Goals:

- Sewerage plant disposal site
 - Keep operating dams in a good working condition;
 - Make sure that water leaving the plant is not contaminated;
 - Measuring water entering and leaving the plant;
 - Removal of unsuitable waste before waste enters the plant,
 - Upgrading of the bulk capacity if required.
- Sewerage network
 - Regular pre-clean sewerage pipes in a program;
 - Reducing blockages through maintenance and customer education;
 - All manholes must be inspected;
 - Expansion of network to areas without it.
- Buckets
 - Supply more buckets (at least two per house);
 - Regular bucket removal;
 - Upgrading to a waterborne system.

d) Road Network and Stormwater Systems

Within a regional context, national roads are considered as the most important roads to be maintained and kept in a good condition. These roads link the region with other regions and provinces and serve as an important purpose to distribute goods and services. In general, the region currently seems to have a good network of roads, but a number of roads (especially primary provincial roads) are not being maintained properly.

The rural areas are, however not well serviced in terms of road networks, despite the fact that a lot of development is taking place in these areas. Rural areas are also the most attractive from a tourism point of view but sometimes inaccessible due to the road networks or the condition of the road.

As far as urban streets are concerned, it has always been the responsibility of the municipalities themselves. Since streets are not considered a basic service, streets have largely been neglected in the past. District municipalities should consider assisting municipalities where:

- National or major regional roads pass through towns, and
- The development of streets is linked to or integrated with other services (such as housing development).

Apart from this, there is very little stormwater planning taking place in urban areas, therefore creating several problems in that streets need to be upgraded on a regular basis.

The deteriorating road network places a damper on development as accessibility is of critical importance for the economy of the region, the proper functioning of the social network and safety

and security. However, very limited funds are available for this purpose. The management of road maintenance and construction is a serious problem. Management is local but little communication between the community that uses the roads and the service provider exists. The road network is probably one of the biggest challenges to overcome, if Mantsopa is to have a growing economy and a prospering population.

Goals:

- Tarred and gravel roads
 - Maintenance and repairing of potholes in tarred roads;
 - Sealing of tarred roads annually;
 - Grading and maintenance of gravel roads in Mantsopa.
- Stormwater management
 - Management of stormwater drainage;
 - Routine maintenance of open canals and gutters;

e) Waste Disposal Services

Waste management, particularly refuse collection and disposal, is currently the function of the local municipality. The provision and management of waste disposal sites, has in recent years been subject to stricter enforcement of statutory requirements. In general the larger towns have by and large complied with these requirements. In the smaller towns the ad hoc approach of the past is often still in practice. The provision of legal local refuse dumps, particularly the process involved to establish these facilities, is expensive for smaller towns.

The influx of people from the rural areas to towns has resulted in urban growth. Many of these settlements have backlogs in the provision of housing, social and public health services. In these areas waste storage facilities, collection and waste disposal services including street sweeping are virtually non-existent.

The magnitude of urban solid waste problem is expected to increase because of the population growth, increased urbanisation of the already densely populated areas and the improved standard of living, which inevitably results in more waste.

To reduce health risks, it is important that in areas of high population density such as the low-cost housing developments and informal settlements, well controlled and regular systems of solid waste management are in place. This will help prevent the unsightly appearance of waste that is dumped in an unregulated way. Waste management systems for low cost housing development need to be practical, affordable and acceptable to the community, and designed to prevent damage to the natural environment.

Goals:

- Waste disposal site
 - Apply to applicable legislation;
 - Arrange effective control (gate) at disposal site;
 - Supply a burner for effective disposal of waste;
 - Fencing of the site;
 - Recycling of material.
- Collecting refuse removal
 - Collecting refuse program
 - Provide enough refuse buckets/skips on strategic places on corners of streets;

- No waste must be left unattended;
- Recycling of material.

1.7 General Mitigation Measures for the Top 5 Issues Identified within Mantsopa's Urban and Rural Areas

The following table gives an indication of some mitigation measures available for the top 5 environmental issues that were identified in section 4.3 of this report.

- Table 7: Mitigation Measures for Top 5 Impacts for both the Urban and Rural Areas within Mantsopa

Urban Areas	
ENVIRONMENTAL ISSUE	MITIGATION MEASURES
1. Waste Disposal	<ul style="list-style-type: none"> - Address the poverty issue; - Better waste collection services from the municipality; - Education and training of the community around the issue of waste disposal and the effects it can have on the environment and health aspects of the community; - Anyone dealing with waste should at least meet the minimum requirements and standards as set by DWAF; - Environmental Impact Assessments and Management Plans; - Formulation and implementation of by-laws; - Monitoring and Rehabilitation; - Anything that can be used again should be taken out of the waste. This is called recycling or waste recovery; - Compaction of some waste to take up less space. It can also be treated to be less dangerous; - Waste must be disposed off at a properly designed and operated landfill. The sites must have a permit from DWAF; - Industries should use processes that make the least possible waste. Therefore using cleaner technology: <ul style="list-style-type: none"> ○ Avoid extra packaging; ○ Check that machinery is working properly; ○ Use less raw material; ○ Recover and recycle waste wherever possible;

	<ul style="list-style-type: none"> ○ Reduce the toxicity of the waste; ○ Train staff to avoid mistakes that cause waste, such as spilling oil or chemicals; - Make use of more organic materials instead of plastic for the packaging of products; - Provide the municipality with enough equipment to render a better service to the whole of Mantsopa. Larger budget; - Provision of more refuse bins or skips throughout the whole area; - Make use of transfer stations where the community that don't have a waste removal service can dump their refuse. From here the municipality can then dispose the refuse at the registered landfill site; - Implement clean-up projects by involving the community, schools etc.; - Awareness and education campaigns; - Implement the polluter pays principle; - Appropriate legislation as discussed later in this document.
2. Water Pollution	<ul style="list-style-type: none"> - Address the poverty issue; - Conduct environmental impact assessment and management plans where required; - Provide people with adequate services; - Training and education of the community around the issue of water conservation; - Awareness and education campaigns; - Relocation of people living within floodline areas to residential areas; Control measures to prevent people of moving back to the floodline areas; - Protection and conservation of the river edge vegetation in order to protect the river system against siltation and to assist in flood attenuation; - Upgrade of the sewerage disposal system, to a waterborne system; - Establish an official abattoir where people can bring their animals to be slaughtered. The cultural and ritual aspect connected to this might however still create problems; - Removal of cattle, sheep, goats and pigs from residential area to areas such as community kraals situated on the outskirts of town; - Impoundment of animals still kept within residential areas. - Enforcement of relevant laws; - Rehabilitation of degraded environmental areas;
Urban Areas	
ENVIRONMENTAL ISSUE	MITIGATION MEASURES

	<ul style="list-style-type: none"> - Establish new industries in areas where they will have a minimal impact on the environment with special reference to water resources; Monitoring industrial activities and there auditing processes; - Regulation and monitoring of the mining activities in the area; - Prevent overgrazing; - Establish a open space system that incorporates water courses wetlands etc. - Appropriate legislation as discussed later in this document.
3. Urbanization	<ul style="list-style-type: none"> - Address the poverty issue; - Encourage people to stay on farms and not to move to towns; - Land reform process must be speeded up; - Give people a better livelihood on farms like own piece of land to plant vegetables etc.; - Controlled expansion of city; - Relocation of people living within floodline areas or sensitive environmental areas; - Provide additional land for residential extension - use areas where impact on the environment will be minimal. - Conduct environmental impact assessments and management plans where required; - Public participation process; - Appropriate legislation as discussed later in this document.
4. Air pollution	<ul style="list-style-type: none"> - Address the poverty issue; - Conduct environmental impact assessment and management plans where required; - Air pollution monitoring; - Training and education of people; - Electrifying areas that are still without electricity; - Making use of smokeless stoves; - Provide electricity at affordable prices; - Create job opportunities; - Prevent veldfires especially the high frequency at which they sometimes occur; - Relocation of the piggery at Tweespruit to an area where impacts will be lower. - Appropriate legislation as discussed later in this document.

5. Overgrazing and Erosion	<ul style="list-style-type: none"> - Address the poverty issue; - Conduct environmental impact assessment and management plans where required; - Monitoring of vegetation cover on slopes, riverbanks and other sensitive areas; - Areas with steep slopes should not be left unvegetated. Rehabilitation of these areas being very important. Areas can be camped off until vegetation is re-established; - Impoundment of animals that is found within residential areas; - Establishment of community kraals outside residential areas; - Speed up the land reform process; - Training and education of the community; - Prevent veldfires especially the high frequency at which they sometimes occur; - Protection and conservation of vegetation on steep slopes and areas of erodible soils in order to conserve soil resources; - Encouragement of communities to plant trees, lawns and shrubs to help combat erosion; - Improve the storm water systems especially alongside gravel roads. - Appropriate legislation as discussed later in this document.
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Rural Areas

1. Loss of Biodiversity	<ul style="list-style-type: none"> - Protection of key habitat areas; - Conduct environmental impact assessment and management plans where required; - Protection and conservation of the river edge vegetation in order to protect the river system against siltation; - Sustainable resource utilization; - Removal of alien species; - Make use of biological control agents; - Responsible use of pesticides and fertilizers; - Prevent veldfires especially the high frequency at which they sometimes occur; - Firebreaks; - Areas with a high possibility for erosion should implement measures like contour farming, buffer strips of natural vegetation etc to reduce the effect of erosion; - Conservation of sensitive areas; - Appropriate legislation as discussed later in this document.
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Rural Areas

ENVIRONMENTAL ISSUE	MITIGATION MEASURES
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<p>2. Water Pollution</p>	<ul style="list-style-type: none"> - Address the poverty issue; - Training and education of the community around the issue of water conservation; - Conduct environmental impact assessment and management plans where required; - Adequate service provision; - Relocation of people living within floodline areas to residential areas. Control measures to prevent people of moving back to the floodline areas. - Upgrade of the sewerage disposal system; - Prevent animal waste entering the water systems by locating kraals away from water sources; - Responsible use of pesticides and fertilizers; - Protection and conservation of the river edge vegetation in order to protect the river system against siltation and to assist in flood attenuation; - Rehabilitation of degraded areas; - Prevent overgrazing; - Appropriate legislation as discussed later in this document.
<p>3. Agricultural pollution</p>	<ul style="list-style-type: none"> - Conduct environmental impact assessment and management plans where required; - Responsible use of pesticides and fertilizers; - Prevent animal waste in entering water resources; - Implement the polluter pays principle; - Do not farm on environmentally sensitive areas; - Protection and conservation of the river edge vegetation in order to protect the river system against siltation and to assist in flood attenuation; - Prevent spillage of diesel etc during farming activities; - Application of correct farming techniques and practices; - Education and training of farmers especially the emerging farmers; - Appropriate legislation as discussed later in this document.
<p>4. Air pollution</p>	<ul style="list-style-type: none"> - Conduct environmental impact assessment and management plans where required; - Training and education of people; - Electrifying areas that are still without electricity; - Making use of smokeless stoves; - Provide electricity at affordable prices; - Prevent veldfires especially the high frequency at which they sometimes occur; - Create job opportunities; - Appropriate legislation as discussed later in this document.

5. Erosion	<ul style="list-style-type: none"> - Prevent overgrazing; - Conduct environmental impact assessment and management plans where required; - Do not exceed the carrying capacity of the area; - Implement grazing management measures; - Remove alien species; - Prevent veldfires at wrong times and at to high frequencies; - Areas with a high possibility for erosion should implement measures like contour farming, buffer strips of natural vegetation etc to reduce the effect of erosion; - Protection and conservation of vegetation on steep slopes and areas of erodible soils in order to conserve soil resources; - Rehabilitation of degraded areas; - Protection and conservation of functional floodplains in order to mitigate against flood events; - Protection and conservation of river edge vegetation in order to protect river systems against siltation and to assist in flood absorption; - Do not cultivate within 10m of the flood area of a watercourse; - Appropriate legislation as discussed later in this document.
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Source: SSI (2002)

1.8 General Mitigation Measures for Impacts Identified for Future Projects and Developments

The following tables gives an indication of mitigation measures available for possible impacts that projects or future developments identified in section 5.1 & 5.2 of this document might have on the environment.

Table 8: Mitigation Measures for Future Developments as Indicated in the Spatial Development Framework for Mantsopa.

Plans that may contribute to Environmental Impact	Mitigation Measures
1. Residential Extension	<ul style="list-style-type: none"> - Must comply with all the relevant legislation. - Ensure that new developments are planned in an integrated manner. - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, township establishment applications as well as all other permit applications that may be required according to legislation. - Traffic impact studies. - Geotechnical surveys. - Services reports. - Public Participation of the community. - Promote the installation of electricity in RDP houses and require proper isolation in RDP houses and the use of energy saving building materials. - Ensure that developments with visual impact are developed outside of sensitive areas. - Encourage Local Government to: <ul style="list-style-type: none"> o Effective waste removal practice; o Re-use waste; o Recycling of waste;

Plans that may contribute to Environmental Impact	Mitigation Measures
	<ul style="list-style-type: none"> ○ Reduce waste. - Ensure that new developments incorporate effective waste removal systems. - Ensure that new developments provide for proper sewerage systems. - Ensure that adequate bulk water and sanitation capacity is available and that it functions properly so that it will be able to handle the new additional load of the development. - Installation of effective stormwater management measures. - No developments allowed in physical unsafe environments like floodline areas and steep slope areas or areas where the geotechnical conditions is not suitable for development. Also plan residential areas away from industrial areas. - Effective rehabilitation of the environment once construction is complete. - Formulate an environmental management plan where required.
2. Proposed Public Open Space	<ul style="list-style-type: none"> - Effective management of public opens space areas. - Public participation. - Must comply with all the relevant legislation. - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation.
3.	-
4.	-
5. Activity/Mobility and Development Corridors	<ul style="list-style-type: none"> - The requirement for an EIA with every application for the construction of infrastructure and erection of advertising boards where visual impact on environment may be severe. - Visual assessment if required. - Sufficient provision of sanitation facilities during construction and operational phase. - Encourage road safety campaigns. - Maintenance of infrastructure during the operational phase of the project. - Encourage a more affordable, accessible transport system for the community. - Traffic impact study if required. - Effective rehabilitation of the environment once construction is complete. - Formulate an environmental management plan where required.
6. Proposed Hospital	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Visual assessment if required. - Compilation of a services and traffic impact studies if required. - Must comply with all the relevant legislation. - Plan health facilities site outside sensitive areas.

Plans that may contribute to Environmental Impact	Mitigation Measures
	<ul style="list-style-type: none"> - Public participation of the community. - Encourage Local Government to: <ul style="list-style-type: none"> o Effective monitoring and maintenance of incinerators and disposal practices of health facilities. o Controlling of dumpsites. - Introduce a waste management system for all health facilities - Raise awareness of health hazards associated with medical waste. - Effective rehabilitation of the environment once construction is complete.
7. Amphi Theatre	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Visual assessment if required. - Noise pollution assessment and if required noise pollution mitigation measures. - Compilation of a services and traffic impact studies if required. - Must comply with all the relevant legislation. - Public participation. - Effective rehabilitation of the environment once construction is complete.
8. Industrial Developments	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Keep industrial developments away from residential areas. - Noise pollution assessment if in close proximity to residential areas. - Traffic impact study if required. - Public participation of the community. - Encourage industries to make use of cleaner technologies. - Registration of industry to the relevant ISO standards like ISO 14 000. - Environmental management plans. - Monitoring of air water and soil conditions. - Disaster management plan. - Auditing processes. - Effective rehabilitation of the environment once construction is complete.
9. Mixed Land Use Developments	<ul style="list-style-type: none"> - Ensure that new developments are planned in an integrated manner. - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Keep industrial developments away from residential areas. - Noise pollution assessment if required. Traffic impact study if required.

Plans that may contribute to Environmental Impact	Mitigation Measures
	<ul style="list-style-type: none"> - Public participation of the community. - Ensure that developments with visual impact are developed outside of sensitive areas. - Encourage Local Government to: <ul style="list-style-type: none"> o Effective waste removal practice; o Re-use waste; o Recycling of waste; o Reduce waste. - Ensure that new developments incorporate effective waste removal systems. - All outdoor advertising, whether on or off the property must comply with the South African Manual for Outdoor Advertising Control (SAMOAC). - Ensure that new developments provide for proper sewerage systems. - Ensure that adequate bulk water and sanitation capacity is available and that it functions properly so that it will be able to handle the new additional load of the development. - Installation of effective stormwater management measures. - No developments allowed in physical unsafe environments like floodline areas and steep slope areas or areas where the geotechnical conditions is not suitable for development. - Effective rehabilitation of the environment once construction is complete.
10. Sewerage Works	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Locate away from residential areas. - Public participation of the community. - Ensure that adequate bulk sanitation capacity is available and that it functions properly. - Effective monitoring and maintenance during the operational phase. - Plan outside of floodline areas. - Effective rehabilitation of the environment once construction is complete.
11. Tourism Nodes	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Traffic impact study if required. - Public participation of the community. - Ensure that developments with visual impact are developed outside of sensitive areas. - Ensure that new developments incorporate effective waste removal systems. - Ensure that new developments provide for proper sewerage systems. - Ensure that adequate bulk water and sanitation capacity is available and that it functions properly so that it will be able

Plans that may contribute to Environmental Impact	Mitigation Measures
	<p>to handle the new additional load of the development.</p> <ul style="list-style-type: none"> - Installation of effective stormwater management measures. - No developments allowed in physical unsafe environments like floodline areas and steep slope areas or areas where the geotechnical conditions is not suitable for development. - All outdoor advertising, whether on or off the property must comply with the South African Manual for Outdoor Advertising Control (SAMOAC). - Introduce a waste management system on tourism routes & urban areas. - Encourage: <ul style="list-style-type: none"> o The staff of tourist facilities/routes to have a plan on safety and security concerning their facility; o The staff of tourist facilities/routes to formulate rules and regulations concerning the safety of the tourist. - Protection of biodiversity and aesthetical heritage. - Improve knowledge and skills of communities around tourism. - Effective rehabilitation of the environment once construction is complete.
12. Multi Recreational Sport Centre	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Traffic impact study if required. - Public participation of the community. - Ensure that developments with visual impact are developed outside of sensitive areas. - Ensure that new developments incorporate effective waste removal systems. - Ensure that new developments provide for proper sewerage systems. - Ensure that adequate bulk water and sanitation capacity is available and that it functions properly so that it will be able to handle the new additional load of the development. - Installation of effective stormwater management measures. - All outdoor advertising, whether on or off the property must comply with the South African Manual for Outdoor Advertising Control (SAMOAC). - Encourage: <ul style="list-style-type: none"> o Fence off sport grounds; o Sufficient security; o Maintenance of facilities. - Effective rehabilitation of the environment once construction is complete.
13. Filling Stations	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Traffic impact study if required. - Public participation of the community.

Plans that may contribute to Environmental Impact	Mitigation Measures
	<ul style="list-style-type: none"> - Ensure that developments with visual impact are developed outside of sensitive areas. - All outdoor advertising, whether on or off the property must comply with the South African Manual for Outdoor Advertising Control (SAMOAC). - Must make use of effective oil/grease traps/interceptors. Regular cleaning and maintenance of these traps/incinerators. - Regular inspection of fuel tanks for possible leakage and regular maintenance. - Compilation of environmental management plans. - Audits. - Emergency response plan. - Effective rehabilitation of the environment once construction is complete.
14. Mining	<ul style="list-style-type: none"> - Encourage better co-ordination between local government, DME, DTEEA and other relevant departments. - Environmental impacts and management plan. - Visual and noise impact assessments if required. - Public participation by the community. - Ensure that correct areas are mined. - Implement effective erosion mitigation measures and if required mitigation measures to reduce the amount of dust generated during mining operation. - Undertake operations that will impact least on the environment. - Emergency response plan. - Improve knowledge on sustainable utilisation of natural resources. - Effective rehabilitation once mining is ceased.

Source: SSI (2002)

Table 9: An Indication of the Proposed Mitigation Measures for Projects that have an Environmental Impact as Indicated in the IDP Document of Mantsopa.

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Education, Skills and Information Support			

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Building of new classrooms.	ED2.1.1 & ED1.3.1.3	Mantsopa	<ul style="list-style-type: none"> - Promote the installation of electricity in all school facilities. - Inform schools of potential impact from school busses on the environment. - Ensure that school facilities are not causing visual pollution. - Install an adequate sanitation system. - Introduce a waste management system in all schools. - Develop environmental curricula. - EIAs required for new school buildings in sensitive areas. - Conduct traffic impact studies where required. - Effective rehabilitation once construction is complete.
Safe, Healthy and Secure Environment			
Construction of stormwater calming measures.	ENV7.3.1	Mantsopa	<ul style="list-style-type: none"> - EIA and EMP if required. - Effective rehabilitation after construction is complete.
Development of windshields.	ENV8.5.1	Mantsopa Farmers	<ul style="list-style-type: none"> - Make use of indigenous vegetation. - Visual assessment.
Development of landfill sites closer to communities and recycling facilities at each site.	ENV 9.1.1.3	Mantsopa	<ul style="list-style-type: none"> - Obtain permit from DWAF. - Environmental impact assessment that will include geotechnical and hydrological surveys. - Public participation. - Site location. - Environmental management plan. - Visual assessment. - Locate landfill site downwind from residential areas. - Fencing of the landfill site. - Traffic impact study if required. - Regular monitoring such as the groundwater quality. - Comply to the minimum requirements for water monitoring at waste management facilities as set by DWAF. - Also comply to the minimum requirements for the handling, classification and disposal of hazardous waste as set by DWAF. - Rehabilitation. - Effective ongoing management of the landfill site. - Anyone dealing with waste should at least meet the minimum requirements and standards as set by DWAF; - Compaction of some waste to take up less space during the operational phase of the landfill site. Also to treat some waste to be less dangerous.

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Relocation of piggery.	ENV11.1.1	Tweespruit	- Correct identification of new site away from residential areas.
Planting of trees and grass in areas prone to erosion.	ENV7.1.1	Mantsopa	- Make use of indigenous vegetation.
Health and HIV Aids			
Establishing Aids centers and also clinics in towns that do not have a hospital. Built new hospital.	HIV2.1.1.2 HIV3.2.1.2 HIV3.4.2.2	See Project Sheets Ladybrand	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Visual assessment if required. - Compilation of a services and traffic impact studies if required. - Must comply with all the relevant legislation. - Plan health facilities site outside sensitive areas. - Public participation of the community.
			<ul style="list-style-type: none"> - Encourage Local Government to: <ul style="list-style-type: none"> o Effective monitoring and maintenance of incinerators and disposal practices of health facilities; o Controlling of dumpsites. - Introduce a waste management system for all health facilities. - Raise awareness of health hazards associated with medical waste. - Effective rehabilitation of the environment once construction is complete.
Land and Housing			

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Built special housing units.	HL1.3.1.3	Mantsopa	<ul style="list-style-type: none"> - Must comply with all the relevant legislation. - Ensure that new developments are planned in an integrated manner. - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, township establishment applications as well as all other permit applications that may be required according to legislation. - Traffic impact studies. - Geotechnical surveys. - Services reports. - Public Participation of the community. - Promote the installation of electricity in RDP houses and require proper isolation in RDP houses and the use of energy saving building materials. - Ensure that developments with visual impact are developed outside of sensitive areas. - Encourage Local Government to: <ul style="list-style-type: none"> o Effective waste removal practice; o Re-use waste; o Recycling of waste; o Reduce waste. - Ensure that new developments incorporate effective waste removal systems. - Ensure that new developments provide for proper sewerage systems. - Ensure that adequate bulk water and sanitation capacity is available and that it functions properly so that it will be able to handle the new additional load of the development. - Installation of effective stormwater management measures. - No developments allowed in physical unsafe environments like floodline areas and steep slope areas or areas where the geotechnical conditions is not suitable for development. Also plan residential areas away from industrial areas. - Effective rehabilitation of the environment once construction is complete. - Formulate an environmental management plan where required.

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Land identified for the development of commonages and kraals.	HL6.1.1 HL7.1.1.3 HL7.1.2.1	Mantsopa Borwa	<ul style="list-style-type: none"> - Public participation. - Must comply with all the relevant legislation. - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Kraals should be situated away from residential areas. - Implementation of effective veldt management practices to prevent overgrazing and subsequent erosion problems.
Development of communal gardens. Establishment of small-scale farmers.	HL8.1.1 HL8.2.1	Mantsopa Mantsopa	<ul style="list-style-type: none"> - Promote effective agricultural practices in poverty programmes. - Require EIAs for facilities proposed in sensitive areas. - Ensure that the community is aware of: <ul style="list-style-type: none"> o Better farming practices; o Biological control measures; o Correct use of fertilizer and pesticides; o Cost-effective measures to reduce erosion and surface run-off. - Prevent alien invasion. - Awareness campaigns concerning the environment.
Local Economic Development			

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Development of filling station.	LED2.5.3.3	Tweespruit	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Traffic impact study if required. - Public participation of the community. - Ensure that developments with visual impact are developed outside of sensitive areas. - All outdoor advertising, whether on or off the property must comply with the South African Manual for Outdoor Advertising Control (SAMOAC). - Must make use of effective oil/grease traps/interceptors. Regular cleaning and maintenance of these traps/incinerators. - Regular inspection of fuel tanks for possible leakage and regular maintenance thereof. - Compilation of environmental management plans. - Audits. - Emergency response plan. - Effective rehabilitation of the environment once construction is complete.
Establish arts and crafts markets at strategic places along major routes.	LED1.1.3.3	Mantsopa	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Visual assessment if required. - Compilation of a services and traffic impact studies if required. - Must comply with all the relevant legislation. - Public participation. - Effective rehabilitation of the environment once construction is complete.
Fish farming project implemented	LED1.2.5.2	Mantsopa	<ul style="list-style-type: none"> - Prevent alien invasion in our river systems. - Awareness campaigns concerning the environment.

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Newly CPF SP projects implemented.	LED5.5.2.1 LED5.5.2.2 LED5.5.2.6 LED 5.5.2.11 LED 5.5.2.12 LED 5.5.2.15 LED 5.5.2.17	Excelsior Excelsior Excelsior Excelsior Excelsior Ladybrand Tweespruit	<ul style="list-style-type: none"> - Promote effective agricultural practices in poverty programmes. - Require EIAs for facilities proposed in sensitive areas. - Ensure that the community is aware of: <ul style="list-style-type: none"> o Better farming practices; o Biological control measures; o Correct use of fertilizer and pesticides; o Cost-effective measures to reduce erosion and surface run-off. - Prevent alien invasion. - Awareness campaigns concerning the environment.

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Development of agro-processing businesses and industries.	LED3.1.1.5	Mantsopa	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Keep industrial developments away from residential areas. - Noise pollution assessment if in close proximity to residential areas. - Traffic impact study if required. - Ensure that adequate bulk water and sanitation capacity is available and that it functions properly so that it will be able to handle the new additional load of the development. - Installation of effective stormwater management measures. - Public participation of the community. - Encourage industries to make use of cleaner technologies. - Registration of industry to the relevant ISO standards like ISO 14 000. - Environmental management plans. - Monitoring of air water and soil conditions. - Disaster management plan. - Auditing processes. - Ensure: <ul style="list-style-type: none"> o Better (sustainable) farming practices; o Biological control measures; o Correct use of fertilizer and pesticides; o Cost-effective measures to reduce erosion and surface run-off. - Prevent alien invasion. - Awareness campaigns concerning the environment. - Effective rehabilitation of the environment once construction is complete.
Projects implemented approved by PPAC	LED5.5.3.2 LED5.5.3.3	Hobhouse Ladybrand	<ul style="list-style-type: none"> - Conduct an environmental impact assessment if required. - Prevent alien invasion. - Implement dust mitigation measures if required.

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Communal garden projects established	LED6.1.1.4	Mantsopa	<ul style="list-style-type: none"> - Ensure that the community is aware of: <ul style="list-style-type: none"> o Better farming practices; o Biological control measures; o Correct use of fertilizer and pesticides; o Cost-effective measures to reduce erosion and surface run-off. - Require EIAs for development projects, which may impact significantly on the environment. - Awareness campaigns concerning the environment.
Vegetable garden established	LED6.1.2.1	Excelsior	<ul style="list-style-type: none"> - Same as the above.
Implement fruit tree planting initiatives	LED6.1.3.4	Mantsopa	<ul style="list-style-type: none"> - Same as the above.
Municipal Infrastructure			
Installation of water borne sanitation system.	MI1.2.1.	Manyatseng Tweespruit Dawiesville Masakeng	<ul style="list-style-type: none"> - Conduct EIA study. - Public participation. - Regular monitoring and maintenance of the sanitation system. - Effective rehabilitation once the construction phase is complete.
VIP sanitation system installed.	MI1.3.1.	Mahlatswetsa Dipelaneng Borwa Farms	<ul style="list-style-type: none"> - Conduct EIA study. - Public participation. - Regular monitoring and maintenance of the sanitation system. - Do not install in areas where water pollution can occur. - Effective rehabilitation once the construction phase is complete.
Upgrade of sanitation bulk network.	MI1.4.1.3 MI1.4.1.4	Tweespruit Ladybrand	<ul style="list-style-type: none"> - Conduct EIA study. - Public participation. - Regular monitoring and maintenance of the sanitation system.
Existing sewerage treatment plants capacity increased	MI1.4.2.3	Tweespruit	<ul style="list-style-type: none"> - Effective rehabilitation once the construction phase is complete.
Expand existing electrification network to areas identified.	MI4.1.1	Manyatseng Borwa Dipelaneng Mahlatswetsa Thaba Patchoa	<ul style="list-style-type: none"> - Conduct EIA study if required. - Public participation. - Visual assessment if planned in a sensitive environment. - Effective rehabilitation once the construction phase is complete.
Bulk network capacity upgraded	MI4.3.1.4	Tweespruit Ladybrand	

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
.Upgrading or extension of road network. Establishment of quarries.	MI5.1.2.4 MI5.1.4 MI5.1.5 MI5.2.1 MI5.2.2 MI5.3.1.2 MI5.2.5	See project sheets.	<ul style="list-style-type: none"> - Conduct EIA study. - Permit approval from DME for quarries. - Public participation. - Visual assessment if planned in an sensitive environment. - Environmental management and rehabilitation plan for quarries. - Effective rehabilitation once the construction phase is complete.
Construct road and bridge between Mauersnek and Manyatseng.	MI6.1.1.4	Ladybrand	<ul style="list-style-type: none"> - Conduct EIA study if required. - Public participation. - Visual assessment if planned in an sensitive environment. - Effective rehabilitation once the construction phase is complete.
Bridge constructed between Dawiesville and Borwa.	MI6.1.2.3	Tweespruit	<ul style="list-style-type: none"> - Same as above.
Bridge and culvert constructed between Dipelaneng and Hobhouse.	MI6.1.3.3	Hobhouse	<ul style="list-style-type: none"> - Same as above.
Stormwater channels built.	MI7.1.1.3 MI7.1.1.4 MI7.1.1.5 MI7.1.1.6 MI7.1.1.7	Hobhouse Tweespruit Excelsior Ladybrand Thaba Patchoa	<ul style="list-style-type: none"> - Same as above.
Install water connections.	MI 8.1.1.2	Tweespruit Ladybrand Excelsior Borwa Thaba Patchoa Manyatseng Dipelaneng	<ul style="list-style-type: none"> - Conduct EIA study if required. - Public participation. - Make sure that bulk water capacity will be able to handle the additional water demand. - Effective rehabilitation once the construction phase is complete.
Upgrade bulk water network. Water purification plant enlarges. New bulk lines installed.	MI8.2.1.2 MI8.2.2.2 MI8.2.4.2	Tweespruit Ladybrand Hobhouse Lusaka Tweespruit Ladybrand	<ul style="list-style-type: none"> - Conduct EIA study if required. - Public participation. - Effective rehabilitation once the construction phase is complete.

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
A combined solid waste disposal site provided for Thaba Patchoa and Tweespruit	MI13.1.1.2	Tweespruit	<ul style="list-style-type: none"> - Obtain permit from DWAF. - Environmental impact assessment that will include geotechnical and hydrological surveys. - Public participation. - Site location. - Environmental management plan. - Visual assessment. - Locate landfill site downwind from residential areas. - Fencing of the landfill site. - Traffic impact study if required. - Regular monitoring such as the groundwater quality. - Comply to the minimum requirements for water monitoring at waste management facilities as set by DWAF. - Also comply to the minimum requirements for the handling, classification and disposal of hazardous waste as set by DWAF. - Rehabilitation. - Effective ongoing management of the landfill site. - Anyone dealing with waste should at least meet the minimum requirements and standards as set by DWAF. - Compaction of some waste to take up less space during the operational phase of the landfill site. Also to treat some waste to be less dangerous.
Enlarge cemeteries.	MI14.1.1.2	Ladybrand	<ul style="list-style-type: none"> - Conduct EIA study if required. - Public participation. - Maintenance
Social Development			

Project Description	IDP Project Number	Locality of Project	Proposed Mitigation Measures
Develop multi purpose centers.	SD2.1.1.4	Ladybrand Excelsior Hobhouse Tweespruit	<ul style="list-style-type: none"> - Development must not be allowed until approval of all relevant authorities have been received. This can include EIA's, EMP,s, rezoning applications as well as all other permit applications that may be required according to legislation. - Traffic impact study if required. - Public participation of the community. - Ensure that developments with visual impact are developed outside of sensitive areas. - Ensure that new developments incorporate effective waste removal systems. - Ensure that new developments provide for proper sewerage systems. - Ensure that adequate bulk water and sanitation capacity is available and that it functions properly so that it will be able to handle the new additional load of the development. - Installation of effective stormwater management measures. - All outdoor advertising, whether on or off the property must comply with the South African Manual for Outdoor Advertising Control (SAMOAC). - Encourage: <ul style="list-style-type: none"> o Sufficient security; - Maintenance of facilities.
			<ul style="list-style-type: none"> - Effective rehabilitation of the environment once construction is complete.

Source: SSI (2002)