DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR THE

PROPOSED BELA BELA AGRI-VILLAGE DEVELOPMENT

FOR

BELA BELA FARMYARD ESTATE (PTY) LTD

ON THE FARM

NOODHULP 492 KR

PORTIONS 3, 77, 183, 184 & 195

IN THE VICINITY OF

Local Municipality: Bela Bela Local Municipality
District Municipality: Waterberg District Municipality
Limpopo Province

SOUTH AFRICA

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ENVIRONMENTAL ASSESSMENT PRACTITIONER

Project Team for Bela Bela Agri Lifestyle Village

Name	Organization	Specialist assessment
I. Ueckermann	Environmental Assurance (Pty) Ltd	Senior Environmental Consultant

EXECUTIVE SUMMARY

INTRODUCTION

Environmental Assurance (Pty) Ltd (Envass), as independent environmental consultants have been appointed by Bela-Bela Farmyard Estates (Pty) Ltd to undertake the Environmental Impact Assessment (EIA) for the proposed establishment of the Bela Bela Agri Lifestyle Village. The Bela Bela Agri Lifestyle Village is located in Bela Bela (previously Warmbaths) on the Rooiberg road (R516) towards Thabazimbi in the Waterberg District Municipality. On a regional scale the proposed development is situated on one of the farms on the Mabula road in the Noodhulp area. Since the original registration of the project with the Limpopo Department of Environment, Economic Development and Tourism (LEDET) a Scoping Report and Plan of Study for EIA has been submitted and been approved (Annexure 1: Authority Correspondence).

The Environmental Impact Assessment is being done as part of the planning process of this innovative concept for development in the residential as well as agricultural domain, supported by education and tourism. The developers propose to develop a model, which can be duplicated in neighbouring areas and the rest of the country.

The Environmental Impact Assessment (EIA) process followed is in compliance with the National Environmental Management Act, 1998 (Act 107 of 1998), as amended and the Environmental Impact Assessment Regulations of 2006 (Government Notice No's R385, 386 and 387 in Government Gazette No 28753 of 21 April of 2006). The proposed Agri Lifestyle Village development constitutes a listed activity which falls within the scheduled activities listed in Government Notice Regulation No 387 (Scoping and EIA). Prior to such a listed activity being approved, it is required that an environmental process is undertaken and a report is submitted to the relevant environmental authority for consideration.

The EIA process includes the completion of the Scoping Report as well as an Environmental Impact Assessment Report. The Scoping Report determines the issues or concerns from the relevant authorities as well as interested and/or affected parties. In addition, an Impact Assessment Report has been undertaken to determine the likely consequence that the construction of a township may have on the environment.

PROJECT DESCRIPTION

The proposed project will be on Portions 3, 77, 183, 184 & 195 of the farm Noodhulp 492 KR within Bela Bela Local Municipality, Limpopo Province. The farm is located in the area called Noodhulp just outside Bela Bela town area on the Thabazimbi/Rooiberg road (See Figure 1: Bela Bela Agri Lifestyle Village locality map).

It is proposed that a new Agri Lifestyle Village, including installation of service infrastructure, is developed on the concerned properties. This would entail the

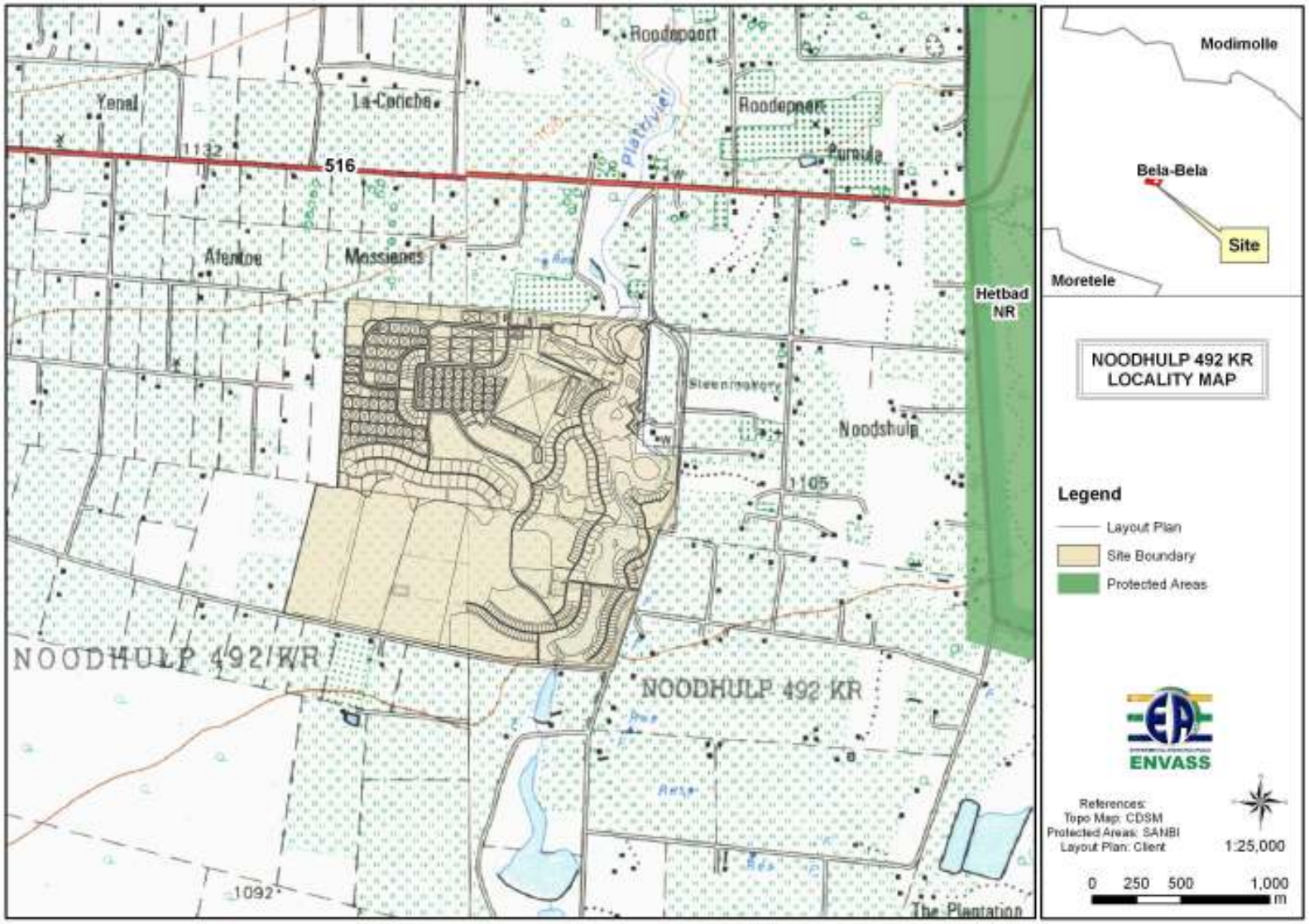

Figure 1: Bela Bela Agri Lifestyle Village locality map

development of approximately 350 housing units (which includes flats and a retirement village), a hotel, guest house and educational facilities. A chapel, commercial services as well as community facilities will be provided for.

The development would attempt to realise a 20% residential land allocation with the remaining 80% an agricultural allocation, linked into a village concept. The residential development would take place on approximately 70 hectare and tourism development on approximately 5 hectare. The remaining land would be utilised for agricultural activities.

The agricultural allocation would entail an aquaculture project (fish farming), olive orchards and lavender as well as horses and the establishment of agribusinesses involving farm management and primary production, agricultural trading and hospitality as well as agri-processing. A mixed use area would provide for some commercial opportunities. Two farm houses exist, which can be upgraded for the Estate manager and a guest house or community centre. There are also a number of workshops and storage rooms, which can be upgraded and partially used for training facilities or agri-processing.

The motivation behind the development of an Agri Lifestyle Village has been stimulated through various factors:

- Saturation of conventional residential neighbourhood development, which remains socio-economically segregated;
- Increased pressure on unproductive agricultural land for residential development;
- Absence of sustainable community development components/initiatives in conventional developments; and
- Lack of suitable middle-income housing opportunities.

The development can be regarded as a programme with an end goal of community development to lead to socio-economic upliftment in the area. The programme consists of the RATE components.

The **RATE** model consists of five operational components, namely **R**esidential harmony, **A**gricultural sustainability, **T**ourism enhancement, **E**ducational upliftment and community development, which is an integral part of the latter four components. It further has a facilitation component consisting of management and consultation to ensure that the process has the desired synergistic outcome and that all stakeholders stay involved to achieve the desired goals in time. Each component will provide, *inter alia*, employment opportunities, training and skills development and or transfer.

The RATE model as a conceptual framework adds value by creating a universal reference and description of the thinking behind the proposed development. It is intended that the combined capacity of each component will allow a community development process with its own goals to harmonise with the other components.

The goals of the project are interspersed within the components of residential harmony, agricultural sustainability, tourism enhancement and educational upliftment. Betterment of those involved in each component will contribute to their development, albeit through skills training, empowerment or capacity building.

For the residential component, community development can be achieved by providing affordable housing, giving the beneficiaries a sense of place and building their self esteem. It can create a secure environment for raising children and strengthening family bonds. Jobs will be provided during construction and operation, providing people with skills training and income, which they can use to improve their lives.

In the Agricultural component there will again be training and job opportunities that will put those involved in a better position to improve their lives. Food production will contribute not only to local people's livelihoods, but also to the national economy.

Tourism has been hailed as one of South Africa's fastest growing industries. Training and employment in this sector will put those involved in a position to be part of this growing industry.

Education forms the basis for development. Through the various initiatives proposed for the project, children will from an early level be made aware of the importance of literacy. The approach to be followed will also include adult education, so people may be empowered in their daily lives.

The development proposal already states what is to be developed in terms of physical capital, but it is important to note also what will be developed in terms of human and social capital. Community development revolves around the development of social capital. The development of human skills can be regarded as an investment and those with skills as valuable resources. Nevertheless, it should be considered what skills are developed since some skills will only be valuable if they can be used elsewhere also (Fitch, 1974). Social capital entails

a) the benefit people get from mutual support networks within horizontal (household/neighbourhood/family networks; and
b) the benefit people get from vertical support networks (institutional/employer etc.).

Figure 2: Project mission and performance areas (Du Toit and van Rensburg, 2008)

PROJECT MOTIVATION

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PUBLIC PARTICIPATION PROCESS

A comprehensive public participation process (See Annexure 2: Public Participation) was followed by Environmental Assurance and as such the project was announced as follows:

Newspaper Advertisement
An advertisement was placed in The Post and the Limpopo Government Gazette on 14 November 2008 and 21 November 2008 respectively.

Site notice
Four (4) site notices were erected on site and at visible locations close to the site on 2 December 2008.

Direct Notification of Identified I&APs
Key stakeholders were directly informed of the proposed development by e-mail and fax between 16 September and 20 October 2009.

Hand – delivered notifications
Letters were hand – delivered to residents of the area on 16 September, notifying and informing them of the proposed development.

I&APs were given 30 days to comment and / or raise issues of concern regarding the proposed development. The comment period expired on 20 October 2009. The main issues that arose from Public Participation Process (PPP) were as follows:

- Issues related to surface water;
- Issues related to groundwater;
- Issues related to air quality;
- Issues related to soils;
- Issues related to fauna and flora;
- Issues related to aesthetic aspects;
- Issues related to land use and capability; and
- Issues related to the socio-economic aspects.

The Draft Scoping Report
The Draft Scoping Report was made available for public comment for a period of approximately four weeks (no less than 30 days) from 21 September 2009 to 20 October 2009. The availability of the Draft Scoping Report was announced as follows:

- Letters announcing the availability of the Draft Scoping Report was send to all registered I&AP's by e-mail, fax or post, approximately three weeks prior to the availability of the report;
- Electronic copies of the report was also e-mailed to registered stakeholders; and
- A hard copy of the Draft Scoping Report was placed at Bela Bela Library;

All the issues raised by the I&AP's during the public participation process of the Scoping phase were captured in an Issues and Responses Report and the I&AP's received letters acknowledging their contributions.

All comments on the Draft Scoping Report were incorporated into the Issues and Responses Report which formed part of the appendices for the Final Scoping Report. The Final Scoping Report was submitted to the Limpopo Department of Environment, Economic Development and Tourism (LEDET) on Friday; 19 February 2010. The final Scoping Report and Plan of Study for EIA were approved by LEDET on Friday, 12 November 2010.

The Draft Environmental Impact Assessment Report

The Draft Environmental Impact Assessment Report was made available for public comment for a period of approximately five weeks (no less than 40 days) from Monday, 14 November 2011 to 25 January 2012. The availability of the Draft Environmental Impact Assessment Report was announced as follows:

- Letters announcing the availability of the Draft Environmental Impact Assessment Report were sent to all registered I&APs by e-mail, fax or post, approximately 3 weeks prior to the availability of the report, on the 1 November 2011;
- A hard copy of the Draft Environmental Impact Assessment Report was placed at the Bela Bela Library; and
- An electronic copy of the Draft Environmental Impact Assessment Report was e-mailed to registered stakeholders requesting copies.

All the issues raised by the I&APs during the public participation process of the EIA phase will be captured in a Issues and Responses Report and the I&APs will receive letters acknowledging their contributions.

The Final Environmental Impact Assessment Report

The Final Environmental Impact Assessment Report will be made available for public comment for a period of approximately three weeks (no less than 21 days) from once comments have been incorporated and the report has been finalised. The availability of the Final Environmental Impact Assessment Report was announced as follows:

- Letters announcing the availability of the Final Environmental Impact Assessment Report will be sent to all registered I&APs by e-mail, fax or post, approximately 3 weeks prior to the availability of the report;
- A hard copy of the Final Environmental Impact Assessment Report will be placed at the Bela Bela Library; and
- An electronic copy of the Final Environmental Impact Assessment Report will be e-mailed to registered stakeholders requesting copies.

All the issues raised by the I&APs during the public participation process of the EIA phase will be captured in a Issues and Responses Report and the I&APs will receive letters acknowledging their contributions.

ALTERNATIVES

The EIA procedure and regulations stipulate that environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. During the EIA phase of the project the various alternatives identified during the Scoping phase are assessed in terms of both environmental acceptability as well as economical feasibility.

- Layout alternatives;
- Alternatives with respect to the density of the layout;
- Water supply alternatives;
- Sewage reticulation alternatives; and
- Solid Waste disposal alternatives.

Following a site visit; undertaken by the EAP and the relevant specialist; it was established that a portion of the area is characterised by a sensitive floodplain and associated riparian ecosystems. The river system as well as the sensitive ecological area was further assessed during the Environmental Impact Assessment phase. The conclusions of the specialist studies were that a buffer zone of 32m along the river would be affected for the proposed development. The buffer zone for wetlands within the urban edge is 32 meters; hence a portion representing the zone of the total area was excluded for development purposes.

It was concluded that the riparian buffer zone would be incorporated into the total development by utilizing it for public open space. No construction of buildings should be allowed in this portion.

In the National Water Act (Act 36 of 1998) chapter 14, part 3 Section 144 it stipulates:
"For the purposes of ensuring that all persons who might be affected have access to information regarding potential flood hazards, no person may establish a township unless the layout plan shows, in a form acceptable to the local authority concerned, lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years."

Therefore, no construction or development may take place within the 1:100 year flood line of a river and this area was also included into the buffer area; excluded for development. The total 1:100 year flood line forms part of the Public Open Space (POS).

IDENTIFICATION OF KEY ENVIRONMENTAL ISSUES

Risks and key issues were identified in the Scoping Phase of the project, were based on consultation with the I&APs, through an internal process based on similar developments, as well as the experience of the EAP and an environmental impact assessment.

The risks and key issues are discussed in greater detail in the EIA report and include the following:

Biophysical Issues:

- Impacts on the floodplain environment;
- Impact on the rate of erosion;
- Impact on runoff;
- Impact on quality of surface water;
- Ground water contamination;
- Soil erosion and surface water runoff;
- The quality of the Plat River and associated water cathments; and
- Flora and Fauna displacements.

Social issues:

- Impact on aesthetic quality;
- Impact on sense of place;
- Impact on economic and employment status;
- Nearby heritage sites; and
- Impact on infrastructure services.

Specialist studies assisted with the development and understanding of the system processes and the potential impacts of the proposed development on both the biophysical and social environments. The following specialist studies were undertaken as part of the Scoping phase:

- Social Study Report;
- Groundwater Report;
- Vegetation Assessment;
- Heritage Impact Assessment; and
- Traffic Impact Assessment.

Each issue was assessed and mitigatory measures proposed such that impacts were minimised or negated.

CONCLUSIONS AND RECOMMENDATIONS

The main objective of the Bela Bela Agri Lifestyle Village development is to establish a sustainable living environment for the inhabitants of Bela Bela area by allowing local social supportive facilities to be provided.

The Scoping Phase of the EIA process was aimed at establishing the scope of the proposed development throughout its phases, as well as its potential impacts on the surrounding environment. The evaluation of the project motivation, the status quo of the social and natural environment as well as inputs from Interested and Affected parties during the Scoping Process highlighted the following needs and concerns:

- The need for a Heritage Impact Assessment;
- The need to address storm water run-off;
- The need to address supply of clean water; and
- The need to address water pollution and abstraction.

Key impacts, together with potential cumulative impacts were assessed during the impact assessment phase of the project and appropriate mitigation measures to reduce the identified impacts as far as possible were proposed. The summary of the significance of identified impacts before and after mitigation is given in the table below:

Table 1: The environmental aspects identified during the Scoping phase of the project

Environmental Aspect	Significance without mitigation	Significance with mitigation
Groundwater contamination	Medium	Low
Soil erosion and surface water run-off	Medium	Low
Water quality in the Plat River	High	Medium
Floral and Fauna displacements	Medium - Low	Low
Habitat destruction within the 1:100 flood line	Medium - High	Medium
Dust and noise generation	Low - Medium	Low
Visual intrusion	Low - Medium	Low
Destruction of heritage sites	Medium - High	Medium

With regards to the status quo of the Agri Lifestyle Village development and information made available to the consultant, the proposed development will not result in any fatal flaws in terms of the environment that should prevent the development proceeding. Provided that the correct mitigation measures are implemented in accordance with the EMP, impacts that would potentially have a significant negative effect on the environment will be minimised to medium and low impacts.

The mitigation measures suggested by the specialists in their reports include:

Vegetation Assessment:

Vegetation surveys were done on the farm Noodhulp 492 KR portions 3; 77; 183; 184

and 185 as part of a vegetation sensitivity analysis. The current state of the vegetation was determined. Indicator and common species were used to determine the ecological state of the vegetation. Vegetation units on the area were transverse for the identification of any rare and endangered plant species that might occur on the property.

Survey sites were selected within each section of the property which appeared to be homogeneous. Surveys were done by using a belt transect of 200m² at each survey site (See Annexure C). Cover and growth form determinations were done according to the criteria of Westfall et.al (1996) for all species rooted within the quadrate. With the exception of the sample sites, the areas were transverse for other species as well as rare and endangered species (see Annexure B & C).

Vegetation on the area is severely degraded, with the exception of an area within the west of the property where natural vegetation occurs. Alien vegetation, high numbers of forb species in conjunction with high densities of pioneer grass species emphasises the fact of severely degraded vegetation.

Heritage Impact Assessment:

The only important cultural heritage resource found on the proposed development area is the 1940's farmhouse and garden. The farmhouse is typical of the 1940's architecture of farm settlements. At this stage the economy of the century was still in a recession. Farmhouses were simple with no luxuries.

The house is only of local importance as it represents a typical farmhouse of the period in the Waterberg area.

The 1940's house is important and can be retained in the new development or an application for a demolishing permit can be made. In this instance a Phase II heritage impact assessment and documentation has to be undertaken. If any graves or cultural heritage resources are unearthed during construction all work in that specific area should be stopped till the site has been inspected and mitigated by a heritage practitioner.

Groundwater Assessment:

- The proposed site is situated in the Crocodile West and Marico WMA (WMA 3) in the Limpopo Province;
- It is within catchment A23G which is shared between Limpopo and North West Province;
- The site is characterised by geology of the Karoo Supergroup (Springbok flats basin);
- The main aquifer system is the weathered and fractured aquifer of the Karoo Supergroup;
- The aquifer is classified as moderate to high yield (3-10 ℓ/s); this was confirmed by the results of the pumping test;
- From the available data, the groundwater is of good quality;

- No groundwater quality data was available from NGA;
- No samples were collected for analysis;
- The risk of the groundwater contamination is limited although the potential of contamination should not be neglected;
- Risks that were identified include construction, waste storage, waste disposal and water storage facilities (sewage);
- The vulnerability, tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer, is classified as medium;
- According to this estimate a medium level groundwater protection is required for the aquifers underlying the proposed site. Reasonable and sound groundwater protection measures are recommended to ensure that no cumulative pollution affects the aquifer, even in the long term;
- With respect to pumping test data, the Cooper-Jacob and the inflection point solutions report a higher sustainable yield than the Basic FC solutions;
- The determined sustainable yield should be used with care as the extent of the cone of depression is unknown together with the boundary conditions as they were not encountered, possibly as a result of short pumping periods, or they are not present;
- Boreholes BH1, BH3, BH5 and BH6 have a higher sustainable yield compared to the other boreholes;
- The extent to which these boreholes influence each other during pumping is unknown as there was no observation borehole during the pumping test;
- Boreholes BH1, BH3, BH5 and BH6 are recommended for operation; and
- The current abstraction does not exceed the allocatable groundwater resource.

Surface water report

The Bela-Bela Agrivillage will be a combination of an estate, i.e. a residential area supporting 350 residences, as well as a farm on which crops will be cultivated and other farming activities will take place. It is intended to appeal to the environmentally conscious person who would like to live in such a country estate.

It locates immediately to the west of the town of Bela-Bela on portions of the farm, Noodhulp 492 KR. A relatively small, but perennial river, the Plat River, flows through the estate. There are two dams located in this river, both of which are registered with the Department of Water Affairs (DWA) for the storage of water and the use of water for agricultural use.

The study area locates within the Crocodile (West) and Marico Water Management Area. This report includes a description of the surface water flow patterns and flow quantities across the study area. This description also includes the modelling of the 100-year flood lines along the Plat River for its length flowing across the study area in terms of Section 144 of the National Water Act of 1998 (Act 36 of 1998). However, due to inadequate survey data, we were unable to produce continuous 100-year flood lines for

the entire section of the river crossing the estate. This work will therefore have to be re-done before approval of the establishment of the township will be approved.
The next section of the report looks at the water quality in the Plat River and shows that this water is of an excellent quality.

The final section of the report discusses the water requirements of the estate and this section culminates in a water balance diagram showing all the in- and outputs that would have to be considered by the developers of the estate. It also shows that there may be a small shortfall in the supply of groundwater, serving the estate.

Traffic Impact Assessment:
Based on the expected additional traffic generated from the planned 350 housing units within the Bela Bela Agri Lifestyle Village, the burden on the intersection of Road D1047 to Main Road R516, will be required to improve the intersection for traffic flow and safety reasons.

The four planned access points to the proposed development will ensure the distribution of additional traffic onto road D1047 and traffic congestion is not expected at all. Sight distance on the main intersection will not pose any problems with regard to traffic safety.

The distances between access points and intersection is within accepted standards and section is within accepted standards and will allow for proper flow of traffic to and from the Bela Bela Agri Lifestyle Village site.

Social Impact Assessment:
The main strengths of the project are existing infrastructure, proximity to town, natural resources, i.e. fertile land and ample water. Education forms the basis of all the components to achieve community development. In support of this, major educational institutions are involved to assist in building these components through quality education and training programmes. Opportunities created through this are plenty and skills are also transferable to other areas.

The project has the further advantage of having partnerships with major firms to ensure economic viability. Specialists are on board to ensure good quality products and efficient management to ensure the farm functions as a sustainable unit.

In all components of the project the strengths and opportunities outweigh the threats and weaknesses. The developers should therefore build on the strengths and seize the opportunities to overcome the weaknesses and eliminate the threats as far as possible.

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LIST OF ABBREVIATIONS

CONEPP	Consultative Environmental Management Policy Process
CBD	Central Business District
DWAE	Department of Water and Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
ECO	Environmental Control Officer
EIR	Environmental Impact Report
ENVASS	Environmental Assurance (Pty) Ltd
EMP	Environmental Management Plan
Ha	Hectare
I&AP's	Interested and Affected Parties
IEM	Integrated Environmental Management
IRR	Issues and Responses Report
LEDET	Limpopo Department of Economic Development Environment and Tourism
NEMA	National Environmental Management Act
PPP	Public Participation Process
POS	Public Open Space
PoS	Plan of Study
RSDF	Regional Spatial Development Framework
SAHRA	South African Heritage Resource Authority
SMME	Small Medium Micro-Enterprise

GLOSSARY OF TERMS

Alien species: A plant or animal species introduced from elsewhere: neither endemic nor indigenous.

Anthropogenic: Change induced by human intervention.

Applicant: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as contemplated in the scheduled activities listed in Government Notice (GN) No R. 387.

Arable potential: Land with soil, slope and climate components where the production of cultivated crops is economical and practical.

Ecology: The study of the interrelationships between organisms and their environments.

Environment: All physical, chemical and biological factors and conditions that influence an object.

Environmental Impact Assessment: assessment of the effects of a development on the environment.

Environmental Management Plan: A working document on environmental and socio-economic mitigation measures that must be implemented by several responsible parties during all the phases of the proposed project.

Local relief: The difference between the highest and lowest points in a landscape. For this study, it is based on 1:50 000 scale.

Soil compaction: Soil becoming dense by blows, vehicle passage or other type of loading. Wet soils compact easier than moist or dry soils.

1 INTRODUCTION

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1.1 DETAILS OF THE APPLICANT

Table 2: Name and address of applicant

Project applicant:	Bela- Bela Farmyard Estates (Pty) Ltd
Title Deed information	T0KR00000000049200003, T0KR00000000049200077; T0KR00000000049200183; T0KR00000000049200184; and T0KR00000000049200185
Project title:	Bela- Bela Agri Lifestyle Village
Contact person:	Mr. Louw Du Toit or Mr Willie Van Rensburg
Contact details	072 6736920 or 083 4574282
Postal address:	PO Box 151, Hartebeespoort, 0216

1.2 LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION

This section includes a list of Acts applicable to this project and a brief description of the relevant aspect(s) of the relevant Acts. The aim of this component of the report is to provide a brief overview of the pertinent policies as well as legal and administrative requirements applicable to the proposed development of the Bela Bela Agri Lifestyle Village.

The legislative motivation for this project is underpinned by the Constitution of South Africa (Act No. 108 of 1996), which states that:

The State must, in compliance with Section 7(2) of the Constitution, respect, protect, promote and fulfill the rights enshrined in the Bill of Rights, which is the cornerstone of democracy in South Africa. Section 24 of the Constitution states:

24. Environment.-Everyone has the right-
(a) to an environment that is not harmful to their health or well-being; and
(b) to have the environment 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 a justifiable economic and social development.

Section 24 of the Constitution of South Africa (Act No. 108 of 1998) requires that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to approval. In addition, it provides for the Minister of Environmental Affairs and Tourism or the relevant provincial ministers to identify:

- new activities that require approval;
- areas within which activities require approval; and
- existing activities that should be assessed and reported on.

Section 28(1) of the Constitution of South Africa (Act No. 108 of 1998) states that "*every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring*". If such pollution or degradation cannot be prevented then appropriate measures must be taken to minimise or rectify such pollution or degradation. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution or degradation; and
- Remedying the effects of the pollution or degradation.

1.2.1 NEMA and Environmental Impact Assessment Regulations

The National Environmental Management Act, 1998 (Act 107 of 1998)[NEMA] was enacted in November 1998. The NEMA strives to legislate National Environmental Management Policy and has repealed a number of the provisions of the Environment Conservation Act, 1989 (Act 73 of 1989)[ECA]. NEMA is focussed primarily on co-operative governance, public participation and sustainable development.

NEMA makes provisions for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of the State and to provide for matters connected therewith. Section 2 of the Act establishes a set of principles, which apply to the activities of all organs of state that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised and positive enhanced; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its entire life cycle.

These principles are taken into consideration when a Government department exercises its powers, for example, during the granting of permits and the enforcement of existing legislation or conditions of approval.

The authorities may direct an industry to rectify or remedy a potential or actual pollution or degradation problem. If such a directive is not complied with, the authorities may undertake the work and recover the costs from the responsible industry.

The Environmental Impact Assessment (EIA) process followed is in compliance with the National Environmental Management Act, 1998 (Act 107 of 1998) [NEMA], as amended and the Environmental Impact Assessment Regulations of 2006 (Government Notice No's R385, 386 and 387 of 2006). The proposed development involves 'listed activities', as defined by the NEMA. Listed activities are activities, which may have potentially detrimental impacts on the environment and therefore require environmental authorisation from the relevant authorising body. The proposed development occurs in the Limpopo Province and thus the Limpopo Department of Economic Development, Environment and Tourism (LEDET) is the responsible regulatory authority.

The proposed development involves the following listed activity, as stipulated in the EIA Regulations of 2006, and as such is required to undergo a Scoping/EIA exercise in support of any application to LEDET for environmental authorisation (Government Notice No. 387 of April 2006):

The proposed development includes mixed land use township development which includes:

- Residential;
- Commercial;

- Upgrading of the road infrastructure; and
- Upgrading of supporting infrastructure.

However, since several of these services are already in place only the listed activity below refers.

The proposed development involves the following listed activity as stipulated in the EIA Regulations of 2006:

2. Any development activity, including associated structures and infrastructure, where the total area of the development area is, or is intended to be, 20 hectares or more.

With this application ***"associated structures and infrastructure"*** refer to:
Any building or infrastructure that is necessary for the functioning of a facility or activity or that is used for an ancillary service or use from the facility.

This refer to any bulk and supporting infrastructure required for the Agri Lifestyle Village development to function at it optimum without detrimentally impacting on the surrounding environment. Bulk and supporting infrastructure will include but not be limited to electricity, water reticulation; sewer reticulation; road connectivity to existing roads in the area as well as storm water management structures and waste removal services. Sustainable principles will be at the forefront of this development and as such the bulk and supporting services to the Agri Lifestyle Village will be sustainable and not dependent on the local municipality.

1.2.2 National Heritage Resource Act, 1999 (Act No. 25 of 1999)

In terms of the National Heritage Resources Act, 1999 (Act 25 of 1999), a Heritage Impact Assessment has been conducted for the site since the site is greater than 0,5 hectares (ha) in extent.

The Act makes provision for the potential destruction to existing sites, pending the archaeologist recommendations through permitting procedures. Permits are administrated by the South African Heritage Resources Agency (SAHRA).

1.2.3 Environmental Conservation Act (Act 73 of 1989)

Environmental Regulations were promulgated on 5 September 1997 in the Government Regulation Gazette No. 5999, Gazette Number 18261 in terms of the Environment Conservation Act 1989 (Act 73 of 1989). The regulations contained in sections 21, 26 and 28 of the Act came into effect on or before 1 April 1989. Schedule 1 of Section 21 identifies activities, which may have substantial detrimental effect on the environment, while Section 26 provides regulations regarding activities identified under Section 21.

1.2.4 National Water Act, 1998 (Act No.36 of 1998)

The National Water Act aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that

the nation's water resources are protected, used, developed, conserved, managed and controlled in ways, which take into account:

- Meeting the basic human needs of present and future generation;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations; and
- Managing floods and droughts.

The National Water Act (Act 36 of 1998) chapter 14, part 3 Section 144 specifically applies to this development and therefore no construction or development may take place within the 1:100 year flood line of a river and this area was also included into the buffer area; excluded for development: *"For the purposes of ensuring that all persons who might be affected have access to information regarding potential flood hazards, no person may establish a township unless the layout plan shows, in a form acceptable to the local authority concerned, lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years."*

The project will require the submission of a Water Use License Application (WULA) in terms of Section 21 of the NWA which will include the following activities:

a) Taking water from a resource;
b) Storing water; and
j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

The WULA will be undertaken as a separate process and does not fall within the scope of this environmental authorisation process.

1.2.5 Integrated Environmental Management

Integrated Environmental Management (IEM) is a philosophy, which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (Department of Environmental Affairs: DEAT, 1992). The IEM guidelines intend endearing a pro-active approach to sourcing, collating and presenting information at a level that can be interpreted at all levels.

1.2.6 Development Facilitation Act, 1995 (Act No. 67 of 1995)

The Development Facilitation Act was formulated to facilitate appropriate and speedy land delivery by establishing national uniform standards and legislation. The Act promotes efficient and integrated land development. The proposed development promotes the concept of residential and

employment opportunities in close proximity to each other and optimises the usage of bulk service infrastructure.

The principles of the Development Facilitation Act (DFA) will be held to in the development proposal. These include:

- Maximise the use of existing infrastructure; and
- Employment and residential in close proximity.

1.2.7 Housing Policy for South Africa

The South African constitution of 1996 is one of the few progressive constitutions as a fundamental human right. In the preamble to the Housing Bill of 1997, the Parliament of South Africa recognises that housing as adequate shelter fulfils a basic human need, is both a product and a process, is a product of human endeavour and enterprise, is a vital part of integrated development planning, is a key sector of the national economy and is vital to the socio economic well-being of the nation (Mackay, 1999).

1.2.8 Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970)

The purpose of the Act is to control the subdivision and in connection therewith, the use of agricultural land. The Act applies to areas in the former South Africa that lie outside the borders of local authorities, land which is part of an area subdivided in terms of the Agricultural Holdings (Transvaal) Registration Act, 1919, land in proclaimed townships or former South African Development Trust Land. While these “areas” were effectively removed from existence with the advent of “wall” to “wall” local authorities, an amendment to the Act in 1995 (Proclamation R100 of 1995), explicitly provided for the Act’s continued applicability in areas formally located outside the areas of jurisdiction of municipalities. Act No. 70 of 1970 will be replaced by a new Act that currently serves as a Bill before Parliament. The new Act will support/control the new policy for the Department of Agriculture with respect to the protection of commercial farmland from changes in land-use and to prohibit the subdivision of properties that will create “uneconomical or unviable” production entities.

Subdivisions for plots/smaller farm portions for rural residential occupation of 1 ha to 10 ha would not be dealt with in terms of Act No. 70 of 1970. The Department of Agriculture approached all local authorities in South Africa in order to identify farms located around existing towns that could be utilized for rural residential purposes. The Department’s intension is to “remove” these farms from the ambit of Act No. 70 of 1970. This would allow local authorities to authorize the subdivision of farms in terms of the Division of Land Ordinance, 1986 (Ord. No. 20 of 1986) to a pre-determined size. The following farms in Bela-Bela Local Municipal Area have provisionally been excluded by the Department of Agriculture from the ambit of Act 70 of 1970:
Farm Noodhulp 492 KR

1.2.9 Spatial Development Framework (Bela Bela Local Municipality)

The main reasoning and drive for the development in this area is motivated by the Spatial Development Framework [SDF](2006). In this document it is stated that: “The immediate challenges which the Bela Bela Local Municipality faces are poverty and unemployment, service backlogs, lack of suitable skills, new demands on infrastructure, proper implementation of the Spatial Development Frameworks and roll-over of projects.”

Therefore the key challenge for the district in the land reform process is to deal effectively with the injustices of land dispossession, equitable distribution of ownership, reduction of poverty and economic growth, tenure security as well as a system of land management which will support sustainable land use patterns. This is in line with the National Policy on Land reform, 1997.

Patterns of Land-use

The municipality strives to encourage mixed land-use in the urban areas linking industrial and commercial land areas to residential and commercial land-use areas. It also recommends that land in farming areas where farm workers have become destitute because of changes in agricultural activities, should be transformed into agro-settlements.

2 DESCRIPTION AND MOTIVATION OF PROPOSED ACTIVITY

The proposed project will be on Portions 3, 77, 183, 184 & 195 of the farm Noodhulp 492 KR within Bela Bela Local Municipality, Limpopo Province. The farm is located in the area called Noodhulp just outside Bela Bela town area on the Thabazimbi/Rooiberg road.

It is proposed that a new Agri Lifestyle Village, including installation of service infrastructure, is developed on the concerned properties. This would entail the development of approximately 350 housing units (which includes flats and a retirement village), a hotel, guest house and educational facilities. A chapel, commercial services as well as community facilities will be provided for.

It is proposed that approximately 200ha of the land will be used for commercial farming. This farming will encompass both fruit and vegetable farming with a portion of flower and herb growing.

While the emphasis of this project is one of a commercial venture with an agricultural-lifestyle, this cannot be realized by excluding the immediate and surrounding neighbours, and without applying the processes which will ensure and measure the impact of the area's economic growth.

With this in mind a section of approximately 25ha will be set aside for an agricultural training facility. It is proposed that this facility will initially be used to train the persons who will farm the project land, thereafter a process to teach farmers from the adjacent farms will be put into place.

The farmers from the adjacent area who participate in the training will be supported with a mentorship program at the end of their training and will be further supported with off take agreements through the farms principal marketing program.

With global food security issues dominating the developer have secured the support of a major retailer for off take agreements. This retailer will give growing programs allowing the developer to negotiate sub-growing programs to the community farmers, with each farmer participating in a larger off take agreement managed by the principal farm.

A centralized pack house will be established on the property and all produce grown will be dispatched from this pack house.

In addition to the pack house a number of smaller value add business are planned, pickling, jam making etc. added to this will be centralized services supporting both the farm and the community farms thereby creating an even larger amount of enterprises.

To support this initiative the training facility will also train business and life skills.

A detailed business plan for this section of the initiative is being designed and various produce will be explored.

The development would attempt to realise a 20% residential land allocation with the remaining 80% an agricultural allocation, linked into a village concept. The residential development would take place on approximately 70 hectare and tourism development on approximately 5 hectare. The remaining land would be used for agricultural activities.

The agricultural allocation would entail an aquaculture project (fish farming), olive orchards and lavender as well as horses and the establishment of agribusinesses involving farm management and primary production, agricultural trading and hospitality as well as agri-processing. A mixed use area would provide for some commercial opportunities. Two farm houses exist, which can be upgraded for the Estate manager and a guest house or community centre. There are also a number of workshops and storage rooms, which can be upgraded and partially used for training facilities or agri-processing.

The motivation behind the development of an Agri Lifestyle Village has been stimulated through various factors:

- Saturation of conventional residential neighbourhood development, which remains socio-economically segregated;
- Increased pressure on unproductive agricultural land for residential development;
- Absence of sustainable community development components/initiatives in conventional developments; and
- Lack of suitable middle-income housing opportunities.

The development can be regarded as a programme with an end goal of community development to lead to socio-economic upliftment in the area. The programme consists of the RATE components.

The **RATE** model consists of five operational components, namely **R**esidential Harmony, **A**gricultural sustainability, **T**ourism enhancement, **E**ducational upliftment and community development, which is an integral part of the latter four components. It further has a facilitation component consisting of management and consultation to ensure that the process has the desired synergistic outcome and that all stakeholders stay involved to achieve the desired goals in time. Each component will provide, *inter alia*, employment opportunities, training and skills development and or transfer.

The RATE model as a conceptual framework adds value by creating a universal reference and description of the thinking behind the proposed development. It is intended that the combined capacity of each component will allow a community development process with its own goals to harmonise with the other components.

The goals of the project are interspersed within the components of residential harmony, agricultural sustainability, tourism enhancement and educational upliftment. Betterment of those involved in each component will contribute to their development, albeit through skills training, empowerment or capacity building.

For the residential component, community development can be achieved by providing affordable housing, giving the beneficiaries a sense of place and building their self esteem. It can create a secure environment for raising children and strengthening family bonds. Jobs will be provided during construction and operation, providing people with skills training and income, which they can use to improve their lives.

In the Agricultural component there will again be training and job opportunities that will put those involved in a better position to improve their lives. Food production will contribute not only to local people's livelihoods, but also to the national economy.

Tourism has been hailed as one of South Africa's fastest growing industries. Training and employment in this sector will put those involved in a position to be part of this growing industry.

Education forms the basis for development. Through the various initiatives proposed for the project, children will from an early level be made aware of the importance of literacy. The approach to be followed will also include adult education, so people may be empowered in their daily lives.

The development proposal already states what is to be developed in terms of physical capital, but it is important to note also what will be developed in terms of human and social capital. Community development revolves around the development of social capital. The development of human skills can be regarded as an investment and those with skills as valuable resources. Nevertheless, it should be considered what skills are developed since some skills will only be valuable if they can be used elsewhere also (Fitch, 1974).

Social capital entails:

a) the benefit people get from mutual support networks within horizontal (household/neighbourhood/family networks; and
b) .the benefit people get from vertical support networks (institutional/employer etc.).

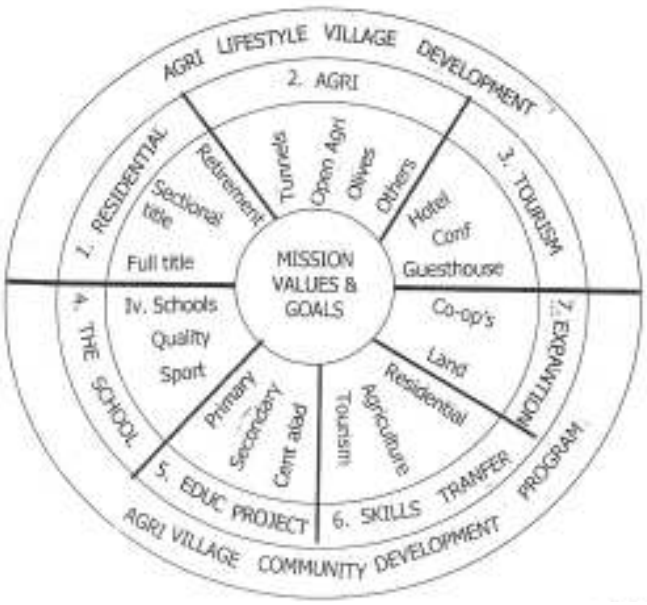

Figure 3: Project mission and performance areas (Du Toit and van Rensburg, 2008)

The goals of the project are interspersed within the components of residential harmony, agricultural sustainability, tourism enhancement and educational improvement. Betterment of those involved in each component will contribute to their development, albeit through skills training, empowerment or capacity building.

3 DESCRIPTION OF THE PROPOSED PROJECT

The 353.4 ha site comprising the proposed Bela-Bela Farm Yard Estate lies in the Noodhulp area, ± 3 km west of Bela-Bela on the Mabula Road. The site consists of portions 3, 77, 183, 184 & 195 of the farm Noodhulp 492 KR. The farm is surrounded by a number of small holdings. The only

development venture in the immediate area is the Out Post Estate, which is a high density up market residential development. However, this development is on hold due the fact that the local municipality is unable to provide the required services such as water for the project.

The Plat River flows southwards through the site for about 3 km. Three dams have been built in the river, but have recently been damaged by floods. Existing infrastructure on the site includes irrigation infrastructure (centre pivots) and tunnels for vegetable production, which has been damaged and removed from the site. There are also two farmhouses and workshops and store rooms with farming implements.

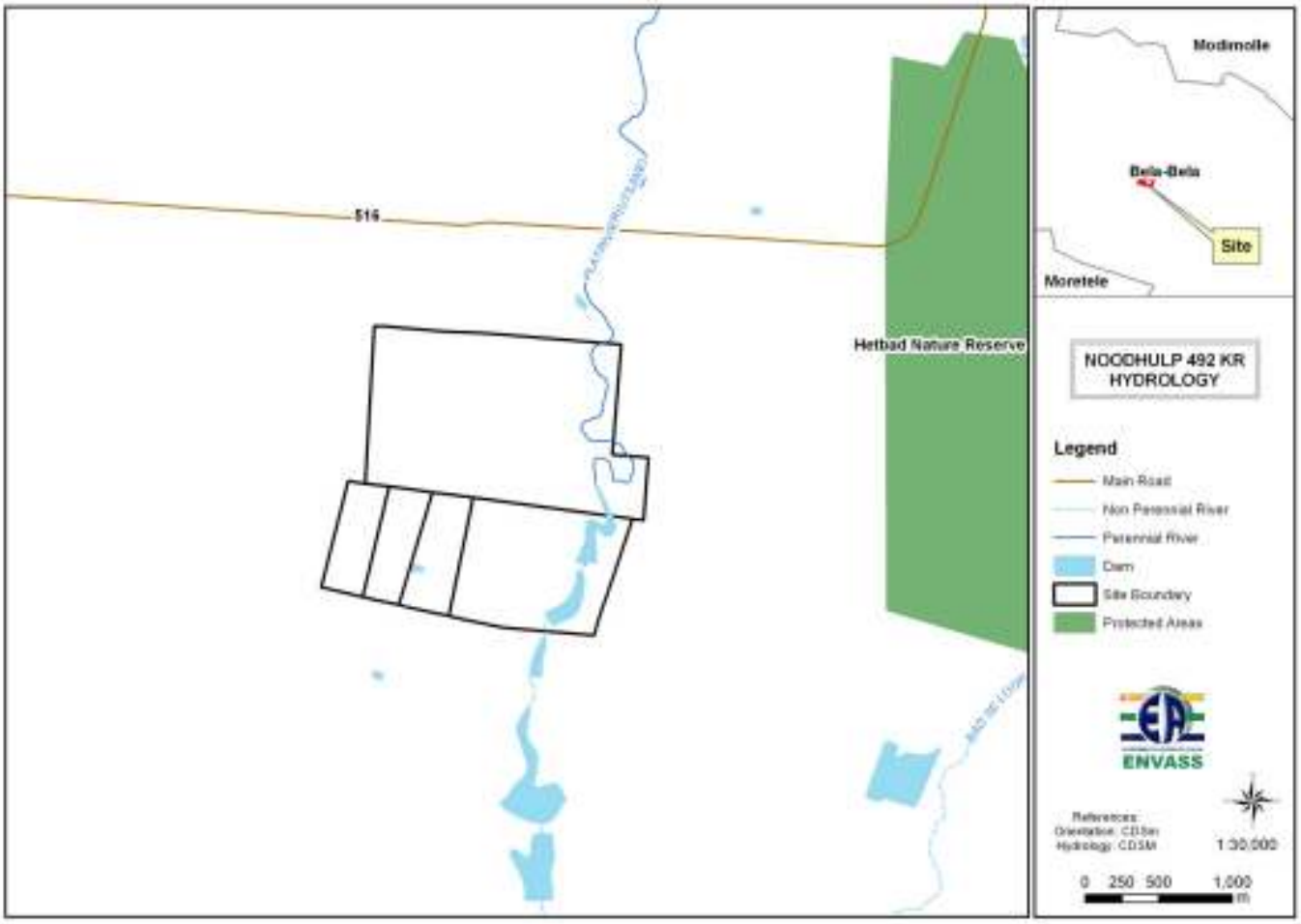

Figure 4: Areal view of the site

1.3 Regional Setting

1.3.1 Bela-Bela Municipality

Bela-Bela Local Municipality falls in the Waterberg District Municipality, located on the western side of the Limpopo Province.

Table 3: Location of the proposed Agri Lifestyle Village

Province	Limpopo Province
District Municipality	Waterberg District Municipality
Local authorities	Bela Bela Local Municipality
Farms on which the proposed development is located	Portions 3, 77, 183, 184 & 195 of the Farm Noodhulp 492 KR
Surrounding towns	Bela Bela

1.4 Surrounding land-uses

Table 4: Land use table describes the surrounding land use of the site.

Table 4: Land use table

Direction	Land Use	Description	Distance (m)
North	Rooiberg Road	Secondary Road	1, 924m
North West	Commercial Farm	Farming	450m
East	Plat River	Watercourse	573m
South	Commercial Farm	Farming	345m
South East	Commercial Farm	Farming	657m
South West	Commercial Farm	Farming	247m
West	Commercial Farm	Farming	376m

The site is situated on the Rooiberg/Thabazimbi Road (R516) to the west of Bela Bela. The area is surrounded by commercial farming activities which gives it a very rural atmosphere although it is still relatively close to the Bela Bela central business district (CBD).

The two main land characteristics of the area is the Rooiberg/Thabazimbi road which is a tar serviced road and can be classified as a secondary national road. The second land characteristic is the Plat River to the east of the proposed development.

1.5 Existing operations

The surrounding land uses in the area consists of predominantly vacant and cultivated land parcels with a few commercial activities. Bela Bela is in close proximity to the proposed development. Agricultural land can be found in the eastern and western regions. The Plat River which flows in a south easterly direction is also located towards the east of the site.

1.6 Proposed project operations

The proposed project will be on Portions 3, 77, 183, 184 & 195 of the farm Noodhulp 492 KR within Bela Bela Local Municipality, Limpopo Province. The farm is located in the area called Noodhulp just outside Bela Bela town area on the Rooiberg/Thabazimbi road (R516).

It is proposed that a new Agri Lifestyle Village, including installation of service infrastructure, is developed on the concerned properties. This would entail the development of approximately 350

housing units (which includes flats and a retirement village), a hotel, guest house and educational facilities. A chapel, commercial services as well as community facilities will also be provided for.

The development would attempt to realise a 20% residential land allocation with the remaining 80% an agricultural allocation, linked into a village concept. The residential development would take place on approximately 70 hectare and tourism development on approximately 5 hectare. The remaining land would be used for agricultural activities.

The agricultural allocation would entail an aquaculture project (fish farming), olive orchards and lavender as well as horses and the establishment of agribusinesses involving farm management and primary production, agricultural trading and hospitality as well as agri-processing. A mixed use area would provide for some commercial opportunities (See Figure 5**: Locality of the proposed Bela Bela Agri Lifestyle Village**). Two farm houses exist, which can be upgraded for the Estate manager and a guest house or community centre. There are also a number of workshops and storage rooms, which can be upgraded and partially used for training facilities or agri-processing.

The goals of the project are interspersed within the components of residential harmony, agricultural sustainability, tourism enhancement and educational improvement. Betterment of those involved in each component will contribute to their development, albeit through skills training, empowerment or capacity building.

For the residential component, community development can be achieved by providing affordable housing, giving the beneficiaries a sense of place and building their self esteem. It can create a secure environment for raising children and strengthening family bonds. Jobs will be provided during construction and operation, providing people with skills training and income, which they can use to improve their lives.

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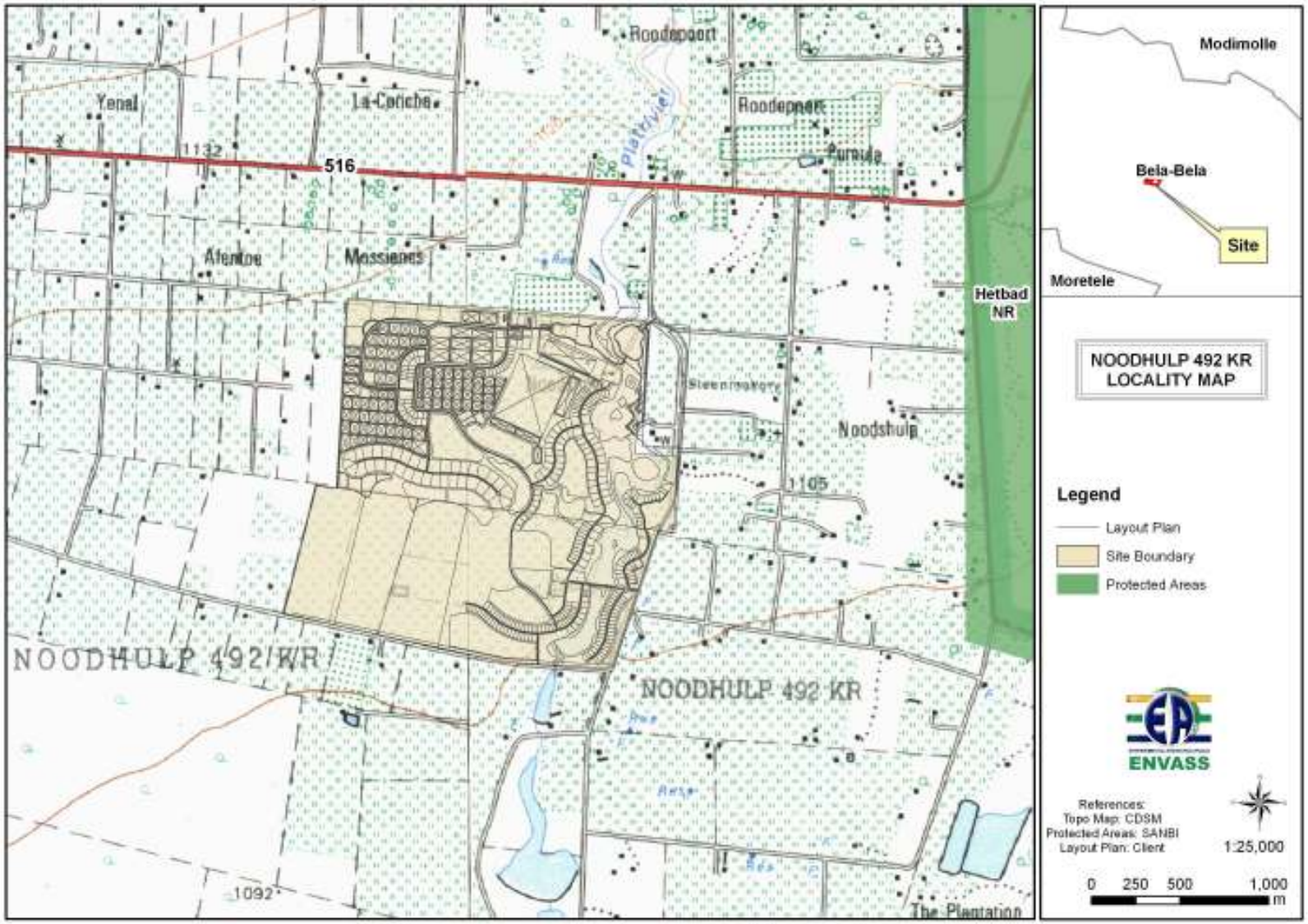

Figure 5: Locality of the proposed Bela Bela Agri Lifestyle Village

The development proposal already states what is to be developed in terms of physical capital, but it is important to note also what will be developed in terms of human and social capital. Community development revolves around the development of social capital. The development of human skills can be regarded as an investment and those with skills as valuable resources. Nevertheless, it should be considered what skills are developed since some skills will only be valuable if they can be used elsewhere also (Fitch, 1974). Social capital entails a) the benefit people get from mutual support networks within horizontal (household/neighbourhood/family networks and b) the benefit people get from vertical support networks (institutional/employer etc.)

1.7 Sustainable design strategy

Sustainability is a concept which was developed during the 90's. The most commonly used definition is:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- *the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and*
- *the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."*

In order for this development to be described and viewed as truly sustainable it is required that the basic design strategy should be sustainable.

It is proposed that this development would utilise renewable energy sources e.g. solar energy. Solar powered electrical generation relies on photovoltaic and heat engines. Photovoltaic systems convert solar radiation into direct current electricity. Such systems can be mounted or build into structures e.g. houses. These systems can generate between 10 and 60 Megawatt (MW).

Furthermore it is proposed that the residential buildings would be orientated towards the sun to capitalise on minimising energy generation. The houses would be arranged to ensure that the maximum sunlight is captured during the day (North facing in the Southern hemisphere). The house design would also accommodate the most beneficial to allow for air flow through the structure.

Building materials which would be used during the construction of the sustainable buildings include clay bricks, indigenous trees for the trusses, north facing window and open areas which would allow for the free flow of air to ventilate and cool the buildings during the warm summer months.

The Bela Bela Agri Lifestyle Village would have view prescriptive ideas which would be enforced through the Corporate Body of the facility. These include but would not be limited to:

- Only indigenous vegetation would be allowed on the premises. It is foreseen that the building arrangement would be such that the lavender and other natural vegetation would form part of the overall vegetation cover of the property;
- Artificial gardening with kikuyu grass would not be allowed;

- No motor washing would be allowed at private residences and the hotels and guest houses. There would be two or three dedicated motor wash facilities throughout the development which would cater for the services;
- No concrete paving would be allowed in private residences, this would ensure that the maximum stormwater is allowed to penetrate into the natural surrounding and the minimum volume would be loss to run-off;
- No private pools would be allowed at residences. It is suggested that communal public open spaces would be utilised for these purposes. This would also contribute to the feeling which the Agri Lifestyle Village wants to promote namely a close community feeling.

1.7.1 Photovoltaic energy

It is planned that electricity will be provided by photovoltaic cells. A solar cell or photovoltaic cell is a device that converts sunlight directly into electricity by the photovoltaic effect. Sometimes the term solar cell is reserved for devices intended specifically to capture energy from sunlight, while the term photovoltaic cell is used when the source is unspecified. Assemblies of cells are used to make solar panels, solar modules, or photovoltaic arrays.

Photovoltaic energy is the most promising and popular form of solar energy. In solar photovoltaics, sunlight is actually converted into electricity. This is very different from a conventional understanding of solar power as only a way of heating water. Sunlight is made of photons, small particles of energy. These photons are absorbed by and pass through the material of a solar cell or solar photovoltaic panel. The photons 'agitate' the electrons found in the material of the photovoltaic cell. As they begin to move (or are dislodged), these are 'routed' into a current. This, technically, is electricity - the movement of electrons along a path.
Wire conducts these electrons, either to batteries or to the regular electrical system of the house, to be used by appliances and other household electrical items. In many solar energy systems, the battery stores energy for later use. This is especially true when the sun is shining strongly.

Photovoltaics is the field of technology and research related to the application of solar cells in producing electricity for practical use. The energy generated this way is an example of solar energy (also called solar power). Due to the growing demand for clean sources of energy, the manufacture of solar cells and photovoltaic arrays has expanded dramatically in recent years. The size and amount of panels used will depend on the individual home owner’s requirements and the size of the house. The energy used will be monitored by a MBS system to ensure that energy levels of each house function at the optimum level without any unnecessary waste.

In this development, houses will have a Grid Tied Solar Electric System, including an inverter, which enables the user to draw electricity directly from the Photovoltaic Panels on the roof without using the solar batteries, which will stay charged for when needed. A 200 litre Solar Geyser will be installed inside the roof with Thermal Siphon Vacuum Solar Panels on the north slope of the roof.

1.7.2 Rainwater harvesting

This is the gathering, storing or accumulating of rain water to provide drinking water, water for livestock and irrigation and to refill aquifers during a process referred to as groundwater recharge.

Household rainfall catchment systems are appropriate in areas with an average rainfall greater than 200mm per year. This system reduces the demand of municipal water services by 97%.

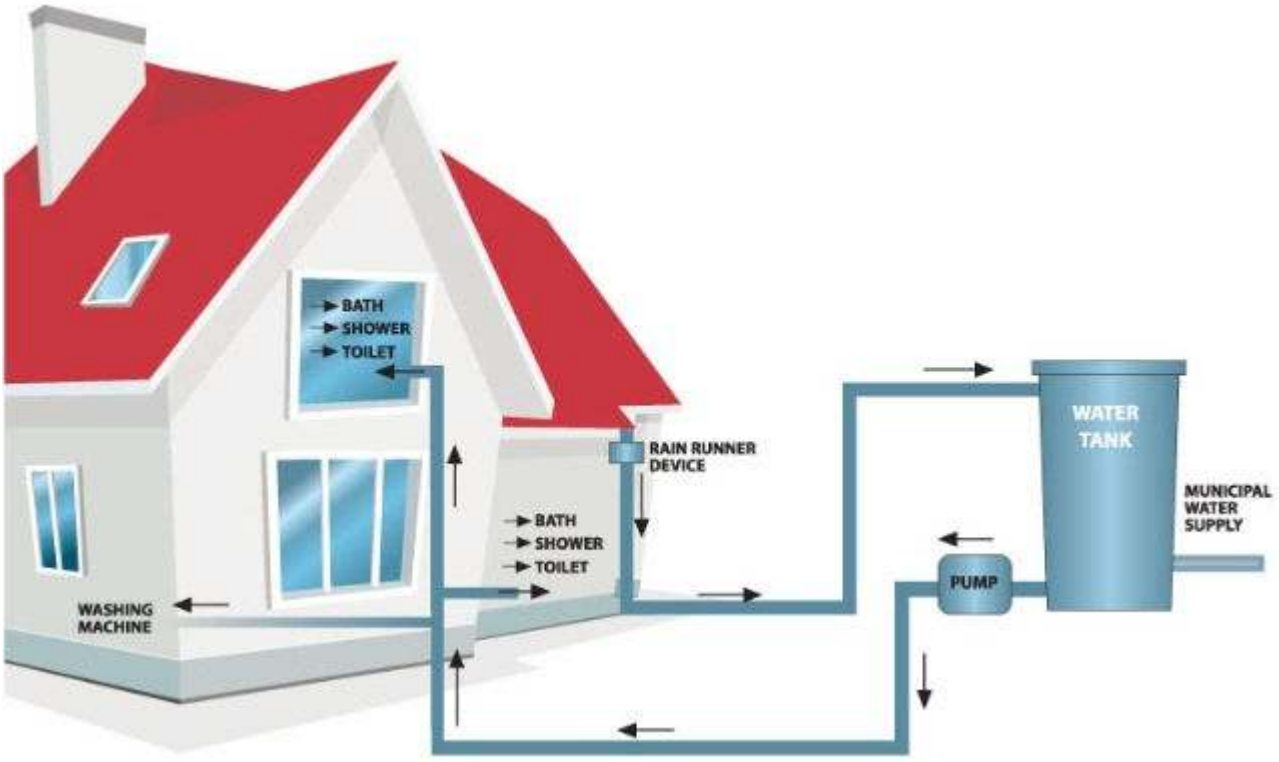

Figure 6: An average rainwater harvesting process

The rainwater harvesting system (see Figure 6: **An average rainwater harvesting process**) decreases the demand for extraction if water from groundwater sources. The most efficient roof surface would be a metal roof which would allow for rainwater collection.
Approximately 11mm rainwater on a metal roof produces 1 000ℓ harvested rainwater for every 100m^2 roof area. This water would be collected and stored in tanks to be utilised as and when required.

1.7.3 Grey water harvesting

Grey water is defined as water from baths, showers, basins and kitchen equipment e.g. washing machines. It is estimated that approximately 33% of water consumed in houses is discharged while this water can be re-utilised for garden irrigation and sewer reticulation systems.

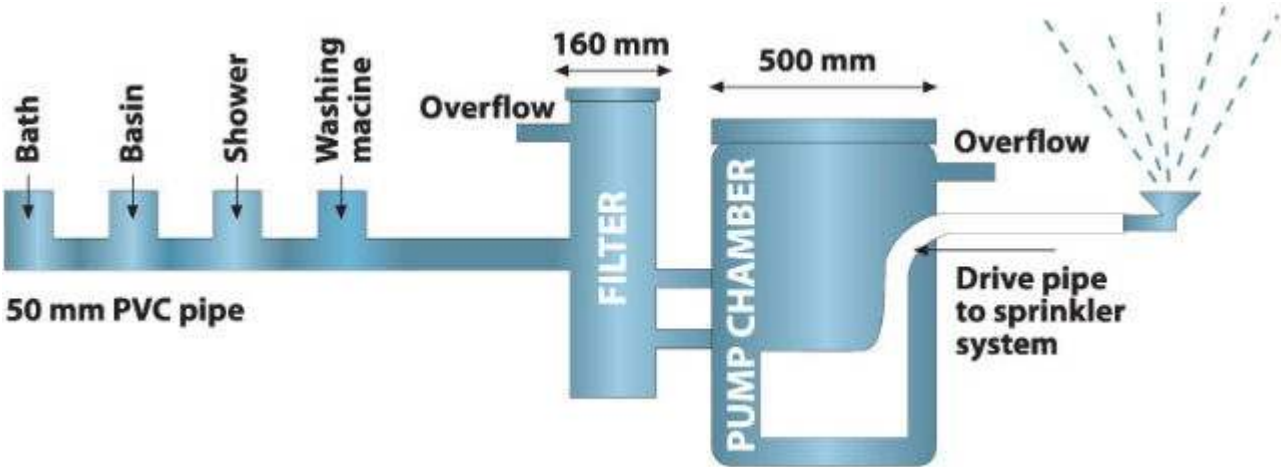

Figure 7: The Grey water system

The pre-requisite for grey water is that it would not be stored as it has anaerobic characteristics which are able to breed and create methane and hydrogen sulphide. If this water is utilised to irrigate a garden it should be carefully planned to prevent the ponding of grey water in the garden which would result in a similar smell of methane as describe above.

The municipalities charge for water and sewerage in a block tariff system. The more water used, the higher the tariff. Municipalities charge for sewerage based only on the volume (number of kilolitres) of water that is consumed. They calculated some time ago (though very erroneously) that seventy percent of the water that is consumed through a household water meter is wasted into the sewer as treatable effluent. Whether households have a rain harvesting system or not, (for water consumed), they will only be able to charge for the amount of water that has run through the water meter, and the same goes for the sewerage charge, at whatever tariff is applicable, based on 70% of that metered water. A household will not be charged for the rainwater used at a residency. The municipality will still charge a household for the effluent portion of the metered water at the rate of 70%, even though the residency may be re-using grey water for irrigation purposes. As a matter of interest, grey water (water from baths showers hand basins and laundry water) and black water (kitchen toilets and bidets) go in the same pipeline to the sewerage treatment works. If recycled grey water from a residency is utilised for irrigation purposes, as little as 5% instead of 70% of consumed and metered water from municipal source, is released into the sewer for treatment at the sewerage treatment works.

1.7.4 Lighting

Lighting within the Bela Bela Agri Lifestyle Village would be provided through two systems. Firstly Compact Fluorescent Lamps (CFL) would provide energy sufficient lighting in and around the house. CFLs provide the same amount of visible light use less power and have a longer life.

Secondly, the Body Corporate of the facility would utilise Liquid Electrical Display (LED) lights for the lighting throughout the complex. The LED lights have a long life expectancy and low energy consumption. Another advantage of the LED lights is that it provides good control over the distribution of the light with small reflectors and mirrors. Therefore the developer would be able to direct lighting to where it is required, thus eliminating the visual impact lighting normally have in a natural environment.

1.7.5 Thermal insulation

Thermal insulation is an important factor to achieve thermal comfort for its occupants. Insulation reduces unwanted heat loss and can decrease the energy demand. The effectiveness of the insulation depends on the quality if the material used as well as the combination of certain materials and environmental factors.

1.7.6 Water saving products

Typical water saving products would be introduced during the construction of the Bela Bela Agri Lifestyle Village. Some of these products are well known whilst others have recently been introduced and have already proven their effectiveness in saving a very scares non-renewable resource, namely water.

3.5.6.1. Water efficient toilets

Toilets account for between 30-40% of domestic water use and up to 90% for offices and public amenities. The use of dual flash toilets uses 4/2 litres water per flush. Another option would be to utilise waterless urinals. These systems are completely waterless and odourless.

A chemical toilet is a toilet using chemicals to deodorize the waste instead of simply storing it in a hole, or piping it away to a sewage treatment plant. These toilets are most commonly found on airplanes, trains, caravans and motorhomes, identified with a blue-colored dye in the bowl water.

3.5.6.2. Flow regulators

A typical basin tap or shower running at mains pressure can easily deliver 20 litres per minute or more. The easiest way to save water with existing basins and showers is to fit a flow regulator. In-line flow regulators save water by limiting flow in the supply pipe. Regulators are available for 15mm or 22mm pipes and have a cartridge which limits the maximum flow to 4 or 6 litres per minute. The three settings on the valve permit full flow, use as an isolation valve for servicing , or the water regulating function.

4 LEGAL DEVELOPMENT RIGHTS

The properties are subject to a number of title conditions. The current zoning for the Portions 3, 77, 183, 184 & 195 of the farm Noodhulp 492 KR is Agricultural. It is proposed that no rezoning would be required as the area is able to handle one (1) residence per hectare. The total area of the farm comprises 350 hectares and therefore 350 residences would be within the stipulation.

1.8 Proposed zoning of the Bela Bela Agri Lifestyle Village

The current zoning of the Bela Bela Agri Lifestyle Village is Agricultural. It is foreseen that this would not have to change as it is planned that 80% of the property would still be utilised for Agricultural purposes.

Table 5: The future zoning and coverage information for the Bela Bela Agri Lifestyle Village.

DEVELOPMENT ZONE	DESCRIPTION	AREA (Ha)	UNITS
Low density residential	Plots at 2 500m^2 full title	19.5	80
Medium density residential	Stands at 850m^2 full title	54.5	640
High density residential	Sectional title townhouses	5	300
Retirement Village	Mixed full title and sectional title	8	300
Mixed use	Commercial services & loft flats	3.5	150
Security	Gate houses and guard rooms	1	3
Recreation	Communal facilities & community centre	3.5	2
Hotel / Lodge	Tourist and conference centre	10	1
Guest houses	Tourist accommodation	1	4
Sport	Soccer and other	2	1
Religious	Chapel	0.5	1
Education	Training college / school / training centre	1.5	2
Agriculture	Active farming		1
Single plot	Remaining stand with house	1	1
Services	Water treatment and reservoir	0.5	2

5 SERVICES

The development is envisaged to be independent of municipal services, electricity and water by using solar energy, and recycling water and waste. There is a river and boreholes on the property, which would supply part of the water for agriculture and residential purposes.

1.9 Water Supply

It is proposed that water will be provided by rainwater harvesting, boreholes and reclamation of used water. A water management programme will be designed and applied wherefrom a minimum of 60% of used water will be reclaimed for reuse especially for irrigation, although it is expected that the quality of the reclaimed water will be good enough to drink. The system which will be used, has specially been designed for this project according to international standards, but has been adjusted for South African conditions.

A Rainwater Harvesting System, consisting of a special rain water trap, water tanks with high pressure pumps and a Silver Technology Granulated Carbon 4 stage filter will be installed. Each house will run entirely on rainwater with an automated water top up, switching the system to alternative water supply automatically when required.

Houses will each have a High Pressure Grey Water System with 1000 litre water tanks, water traps and a Renewable Cartridge Filter. The waste water from the Rainwater Harvesting System is filtered and turned into grey water for the garden and other uses, other than drinking.

The water from the Plat River had a particularly high standard. Not only did it comply one hundred percent with the TWQR (the highest range for these applications) for both agricultural uses, i.e.

livestock watering and irrigation, but, apart from a single determinant (iron) that was marginally over the Class I limit, also complied fully with the highest drinking water standard, Class I of the SANS 241:2006.

In general, the water from the Plat River was of an excellent chemical quality. It complied with the highest guidelines for irrigation water and for the watering of livestock and also complied with the South African drinking water standard in all but one instance. The only determinant that slightly exceeded the recommended range of the drinking water standard was iron. At the concentration found in the sample, the iron could cause a bad taste to the water but would not have any negative health effect on people. If this water were treated in a conventional drinking water treatment plant, all the excess iron would be removed anyhow. By simply chlorinating the water, the excess iron would also be remover.

The Bela-Bela Agrivillage will operate as both a residential estate and agricultural operation. As far as the water use for the agricultural side of the operation is concerned, the required irrigation water will be sourced from the Plat River under a current water licence from DWA. The farm has two dams, both registered with DWA for storage of water and water use for agricultural use.

In addition to the registered use of water from the Plat River, which is allocated exclusively to agricultural use, the farm also has a number of boreholes, some of which are registered with DWA for agricultural use. These registrations will be converted from agricultural use to domestic use and that a new water use licence will be applied for when the township is established.

As part of this change of water use, a geohydrological investigation was carried out by Geo Pollution Technologies – Gauteng (Pty) Ltd and a report was produced (Rambau, 2011). The groundwater report evaluates the amount of water available from this source for domestic use, based on the groundwater pump tests carried out as part of their study. The report concludes that a total sustainable yield of 12 960 m³/month will be produced by the four boreholes which produced the highest yield (i.e. boreholes 1, 3, 5 and 6), should these boreholes be pumped continuously (24 hours/day). This monthly volume relates to a volume of 432 000 l/day from groundwater sources on the farm.

In terms of the Guidelines for Human Settlement, Planning and Design (CSIR Report BOU/E2001, 2000), the per-capita water demand for developed areas fitted with house connections will be as follows:

- Development Level High 250 l/c/day (Range: 130-280 l/c/d)
- Development Level Very High 450 l/c/day (Range: 260-480 l/c/d)

It is believe that a median between the two development levels would be an appropriate value for this particular development, i.e. residences with indoor plumbing, flushing toilets, two showers and baths, but possibly not Jacuzzis, some with dishwashers, all having automatic washing machines and some having small swimming pools. In addition, some water would be used for the watering of a small/medium-sized garden/lawn as well as for the occasional washing of vehicles. The per capita water usage in terms of CSIR BOU/E2001 (2000) would therefore be approximately 350 l/c/day.

The township (or estate) part of the farm will include 350 residential stands, each stand around 1 360 m². This surface area relates to a residence of about 300-400 m², with the balance going to gardens/lawns, etc, i.e. 960 to 1060 m² of garden that has to be watered.

It is estimated that the occupancy of 4 to 6 residents per household on average will be maintained in the development. Although there is a very good likelihood that at least some of these residences in the estate would be used as weekend homes only, this is not a given. During the school holidays it is expected that all residences would be full. For this reason residency has been standardise on a 90% occupancy of 4.5 people per household for this particular development.

In addition to the actual occupants of the stands, it is expected that there will at least be one domestic worker for every two residences and similarly, there will be about one gardener for every four residences. As is the case with the farm workers, these people will not live on the estate, but would be ferried in and out form Bela-Bela by taxi. A total of 175 non-resident domestic workers and about 90 garden workers (i.e. a total of 265 people) would use water during the day in the estate. These people would only use water for ablution and drinking purposes and a water allocation of 15 l/c/day is allowed for them.

In total, there will be 1 418 (90% of 1 575) permanent residents living in the estate and using 350 l/c/day. In addition there will be 25 farm workers using 85 l/c/day and approximately 265 domestic workers and gardeners using approximately 15 l/c/day. The total potable water requirement for the estate will be as follows:

• Permanent Residents:	1 418	x	350	= 496 300 l/day
• Farm Workers:	25	x	85	= 2 125 l/day
• Domestic workers and gardeners:	265	x	15	= 3 975 l/day
			Total:	502 400 l/day

This is equivalent to a water requirement of 15 072 m³/month. Rambau (2011) reports that there is 12 960 m³/month water available from groundwater resources within the property. This leaves a shortfall of 2 112 m³/month (70 400 l/day). This water will have to be sourced from a different source or alternatively the number of residencies will have to be reduced.

This water budget determined above includes only water for drinking purposes for the residents occupying the 350 stands in the estate and their domestic workers, as well as the 25 farm workers on the farm, and does not allow for any additional potential development within the estate (such as restaurants, hotels, guest houses, schools, clinics, etc.).

1.10 Storm Water Drainage System

All storm water from the road and any rainwater runoff from the roofs will be collected in an underground tank in the communal area, containing a high pressure solar powered pump. Rain water collection tanks will be installed in a manner that makes them an architectural feature rather than a mere utility (Rozelle Green Village Website, 2008). A surface water study will be done to determine the floodlines as well as the drainage lines.

The storm water management system for the Bela Bela Agri Lifestyle Village would mimic nature by integrating management of storm water runoff into the surrounding terrain, using systems like landscaped medians, swales and interchange areas to store and treat runoff. Pollutants are removed naturally by vegetation and soil, and the storm water can then replenish groundwater. Natural hydrological cycles and the replenishment of groundwater are not disturbed, and pollutant treatment is usually more effective. Construction and maintenance costs are comparable and often can be less.

The proposed development site slopes predominately in an easterly direction. The main drainage channel is the Plat River which runs more or less along the eastern border of the development. The 1:50 and 1:100 flood lines along the Plat River have been determined and will impede on the development. The flood line area is envisaged to be utilised as a park (public open space).

No normal stormwater drainage system exists on the proposed site. The primary road network will serve as stormwater barriers i.e. The intention is to concentrate all the stormwater along these roads from where it will be transferred into the subsurface pipe system which will discharge into the Plat River and other smaller man made dams on the property. Secondary and Tertiary roads will serve the same purpose as the primary roads, but a lesser scale.

It is foreseen that a combination of the following environmental storm water management systems would be utilised in the Bela Bela Agri Lifestyle Village:

- Permeable pavers;
- Runnels;
- Sustainable landscaping; and
- Green streets.

1.11 Sewage services

Sewage treatment, or domestic wastewater treatment, is the process of removing contaminants from wastewater and household sewage, both runoff (effluents) and domestic. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce a waste stream (or treated effluent) and a solid waste or sludge suitable for discharge or reuse back into the environment. This material is often inadvertently contaminated with many toxic organic and inorganic compounds.

The high cost of some conventional treatment processes has produced economic pressures and has caused engineers to search for creative, cost-effective and environmentally sound ways to control water pollution. At the Bela Bela Agri Lifestyle Village sewage will also be reclaimed; this system has also been specially designed according to international standards and adjusted for South African conditions. There will be one system that will process the total development's sewage. Presently it is foreseen that the system which would be utilised would include a wetland construction system. This would entail black water from the household sewage system to be diverted through a manmade wetland system where nutrients and ammonia would be filtered out of the water (see Figure 8**:** **A typical wetland system**).

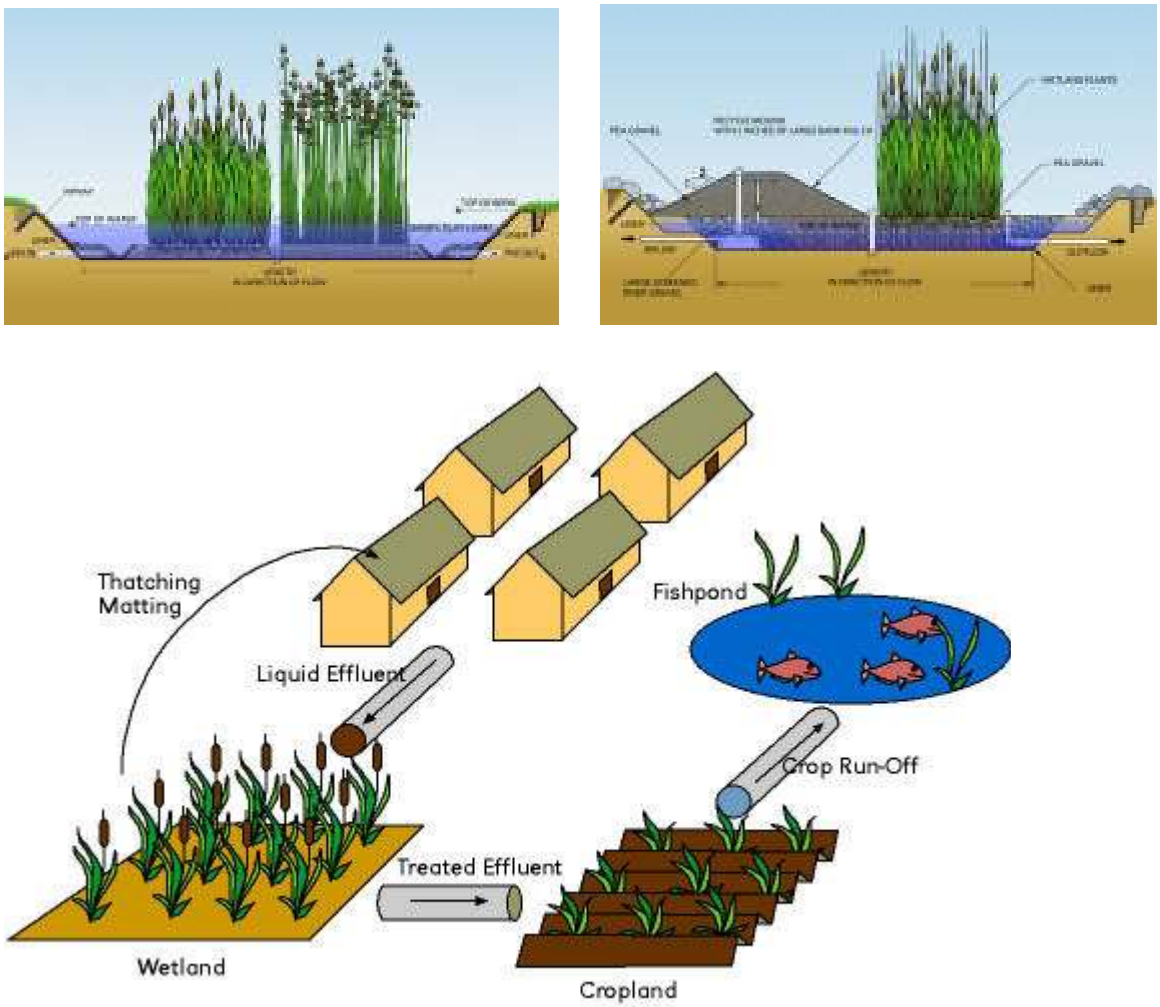

Figure 8: A typical wetland system

Septic tanks would also be utilised throughout the development at some selected constructions. Septic tanks are viewed as a small scale waste water treatment system. A septic tank is simply a big concrete, steel or plastic tank that is buried in the yard. The tank might hold 4,000 liters of water. Wastewater flows into the tank at one end and leaves the tank at the other.

Anything that floats rises to the top and forms a layer known as the scum layer. Anything heavier than water sinks to form the sludge layer. In the middle is a fairly clear water layer. This body of water contains bacteria and chemicals like nitrogen and phosphorous that act as fertilizers, but it is largely free of solids. Wastewater comes into the septic tank from the sewer pipes in the house or other building.

1.12 Access Roads

The proposed development is adjacent to road D1047, which has access from road R516. The proposed development would require two access roads. It is proposed that a residential development with 350 units would be developed, if approximately 80% of these individuals travel during peak time, it would generate approximately 280 trips. This would require that the intersection between the R516 and D1047 should be upgraded to accommodate
All roads built will be natural and will be kept dust free.

Further studies will be done to determine the current traffic volumes in the area and to indicate if a development such as this will have a significant impact on the traffic in this area.

1.13 Electricity

It is planned that electricity will be provided by photovoltaic cells. A solar cell or photovoltaic cell is a device that converts sunlight directly into electricity by the photovoltaic effect. Sometimes the term solar cell is reserved for devices intended specifically to capture energy from sunlight, while the term photovoltaic cell is used when the source is unspecified. Assemblies of cells are used to make solar panels, solar modules, or photovoltaic arrays. Photovoltaic is the field of technology and research related to the application of solar cells in producing electricity for practical use. The energy generated this way is an example of solar energy (also called solar power). Due to the growing demand for clean sources of energy, the manufacture of solar cells and photovoltaic arrays has expanded dramatically in recent years. The size and amount of panels used will depend on the individual home owner's requirements and the size of the house. The energy used will be monitored by a MBS system to ensure that energy levels of each house function at the optimum level without any unnecessary waste.

In this development, houses will have a Grid Tied Solar Electric System, including an inverter, which enables the user to draw electricity directly from the Photovoltaic Panels on the roof without using the solar batteries, which will stay charged for when needed. A 200 litre Solar Geyser will be installed inside the roof with Thermal Siphon Vacuum Solar Panels on the north slope of the roof.

Buildings will be designed and built to be thermally passive. The methods and material used will depend on costs and availability of the material, but the material will have to comply with the Agrémént S.A. standards and be approved to ensure that the carbon footprint of the project is kept to a minimum.

1.14 Solid Waste Disposal

Waste is generated from the start to the decommissioning of a project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing and recycling as far as possible. The Bela Bela Local Municipality would not be responsible for the solid waste disposal

The overall aim of the project is to keep the carbon footprint of the entire project as small as possible. This will include the use of "green" products as far as possible as well as the reclamation of all building rubble during the construction phase. Even the houses will need to be reclaimable, should the project end and the material needs to be reusable at another project.

During the different phases of construction and occupation, waste should be managed as described below:

- Rubble material will be removed from the construction site frequently and disposed of at a licensed dumping site as approved by the local authorities;

- Sufficient containers will be made available on the construction site to handle the amount of litter, wastes, rubbish debris and any other waste generated on the site;
- These containers will be emptied frequently to avoid rodents, insects or any other organisms accumulating on the site and becoming a health hazard to adjacent properties; and
- No waste may remain on any of the construction sites for more than two weeks.

THE RECEIVING ENVIRONMENT

6 BIOPHYSICAL ENVIRONMENT

1.15 Soil and Geology

Millions of years after the intrusion of the Bushveld complex, sediments began to accumulate across the Waterberg system giving rise to distinctive red shales and quartzite masses that make the region so distinctive. It is these cliffs, valleys and buttresses that have protected the fragile vleis and vegetation from over exploitation.

The dominant parent material on the proposed development site is colluvial material from the Magaliesburg formation. There are signs of quartzite material on the southern part of the proposed area underlying the Longlands soils. The Katspruit and Rensburg soils were formed due to illuviation of clay material creating clay soils with water logging properties.

In general the substrate is characterised by sandy soils in the uplands and clayey soils with a high sodium content in the bottomlands. The geology is granite and gneiss with numerous dolerite intrusions and areas covered by gabbro.

The soils that occur on the colluvial parent material follow a specific pattern according to the catena as one move from the crest down the slope to the drainage lines. They are the following:

- **Hutton**: It has an Orthic A-horizon over a red Apedal B-Horizon approximately 80-100cm deep with a medium to high soil fertility and high water holding capacity. Sub-dominant to the Hutton soil is Shortlands soil 10-20 % rocks and boulders in the soil profile.
- **Bainsvlei**: It has an Orthic A-horizon over a Red Apedal B-Horizon over soft plinthite in a yellow brown matrix 60-80cm deep. There are some signs of wetness in the soft plinthite, which will affect the drainage. The water holding capacity is high due to the soil texture.
- **Katspruit**: It has a dark brown Orthic A- Horizon over a grey G- Horizon with serious signs of wetness 40-60cm deep. It is a marginal soil due to wetness and poor drainage and its position in the landscape.
- **Rensburg**: It has a dark brown to black Vertic A-horizon over a grey G-Horizon. 40-60cm deep. It is a marginal soil due to wetness and poor drainage and it's position in the landscape.
- **Longlands**: It has a bleached Orthic A-Horizon over a bleached E- horizon over soft plinthite in a greyish matrix 50-70cm deep. The plinthite is an indication of signs of wetness in the subsoil. The soil has sandy loam texture and occurs at the lower midslope. It is a marginal soil due to wetness, poor drainage and low soil fertility.

At clay percentages of more than 45 the soil type is Arcadia. This means that any foundations should be excavated as deep as the Carbonate rock underneath the soil horizons. Great care should be taken when building on this soil type.

1.16 Soils and agricultural potential

Generally, the area is characterized by vast areas of old cultivated lands (dry lands and centre pivots) where maize was commercially cultivated. Alien vegetation contributes considerably to

cover within the riparian zone of the Plat River. Natural vegetation occurs within an isolated patch within the central section of the area, surrounded by old cultivated lands (Figure 2). Generally, vegetation condition is poor with pioneer and weed species forming a large part of vegetation cover on the area (Refer to Annexure 3: Specialists reports).

1.17 Topography and hydrology

The property earmarked for the proposed development is characterised by a flat topography. However, the Plat River, which flows through the eastern section of the property, contributes to a slight tilt of the landscape towards the far eastern sections of the site. The Plat River falls within the A23G catchment area.

This project falls within an undulation landscape with an altitude which ranges between 1050-1450m and stretch from Northern Province to Mpumalanga and Swaziland. The development under investigation is situated on a gentle concave landscape with a natural watercourse running from southwest to northeast through the area. The concave landscape leads to poorly drained soils in the south and central part of the proposed project.

The Plat River rises on the Farm, Schrikkloof 428 KR. Here the river is known by a different name, the Buffelspruit. It appears that the river section flowing through the mountainous area is known as the Buffelspruit, while the part of the river on the lower plateau is called the Plat River (Afrikaans for “flat river”). The Warmbad Dam, sometimes referred to as the Bela-Bela Dam but in official DWA literature still referred to as the Warmbad Dam, locates in the Buffelspruit in the mountainous area shortly before the stream enters the plateau area and becomes known as the Plat River. The study area is located some 3.5 Km downstream from where the river leaves the foothills and flows onto the lower plateau area.

After passing through the study area, a second stream, the Bad-se-Loop, also originating in the mountainous area to the north of Bela-Bela, but obtaining most of its flow from geothermal springs, from which the original name of the town, Warmbad (Warm Bath) was derived, enters the Plat River from the east. This confluence occurs some 4.7 Km downstream from the study area.

The annual rainfall in quaternary catchment A23G is 626.91 mm of which only 39.6 mm reaches surface watercourses annually, as surface run-off water. The study area is approximately 353.1 Ha. From this surface area and run-off values (39.6 mm/a), it can be calculated that, on average, an annual volume of 15.68 Ml/a (or 42.96 m^3/day) drains off the study area into the Plat River. A significant percentage (26.48%, i.e. 252 Km² of the total quaternary catchment of 952 Km²) of catchment A23G is mountainous. Mountainous areas have higher run-off coefficients than low-lying flatlands, hence our suspicion of an overestimation of the surface run-off.

Part of the on-site study included the identification of potential wetland areas within the study area. If such areas were found, a wetland specialist would investigate and delineate the boundaries of the wetland area/s, based on the soil types (hydromorphic soils) and botanical species (hydrophytes) growing within the area.

However, apart from the river channel of the Plat River (and not even the entire river channel), no areas were identified as wetlands outside the river channel.

There are two medium-sized farm dams in the Plat River within the study area. These dams are in varying degrees of disrepair and the wall of the largest one has been partially washed away recently, leaving only a relatively small pool in the watercourse at present. The spillway of the lower dam is also in a state of disrepair and one or two good thunderstorms could demolish this dam wall entirely, if it is not repaired timeously. Both dams could, however, be repaired quite easily, if this task is not put off for too long. It must be kept in mind that no dam can be built and left indefinitely without requiring maintenance. For example, the roots of trees and the burrows of fossorial animals can quickly undermine a dam's wall. It only requires one small channel through the wall to cause it to collapse catastrophically. From the most recent set of drawings it appears as if these dams form part of the proposed development. For this reason the dam walls and their spillways must be repaired and maintained in a proper condition. When reparations are done, the spillways should be designed to accommodate the discharge of the 100-year flood of 233.7 m³/s.

1.17.1 Groundwater

Information on existing boreholes was obtained from a field census. Borehole yields are moderate to high and the groundwater is used extensively for irrigation in the area. The main aquifers in the area are thought to be fractured and weathered aquifers in the basalt. The static water levels measured in the area during October 2008 show that they vary between 11.1m and 22.2m. As the area is very flat it is difficult to construct a piezometric map. The natural un-impacted flow is expected to mimic a subdued form of the surface topography, i.e. towards the Plat River. Groundwater flow is therefore expected to be in a easterly to south easterly direction.

Recharge can be described as the replenishment from rainfall to the aquifers. Information from the Groundwater Resources Assessment Study (GRA II) gives recharge as 21.43mm/ammum. The total available water from recharge for the property area is thus evaluated as:

= 3 520 000m^2 x 0.02143m

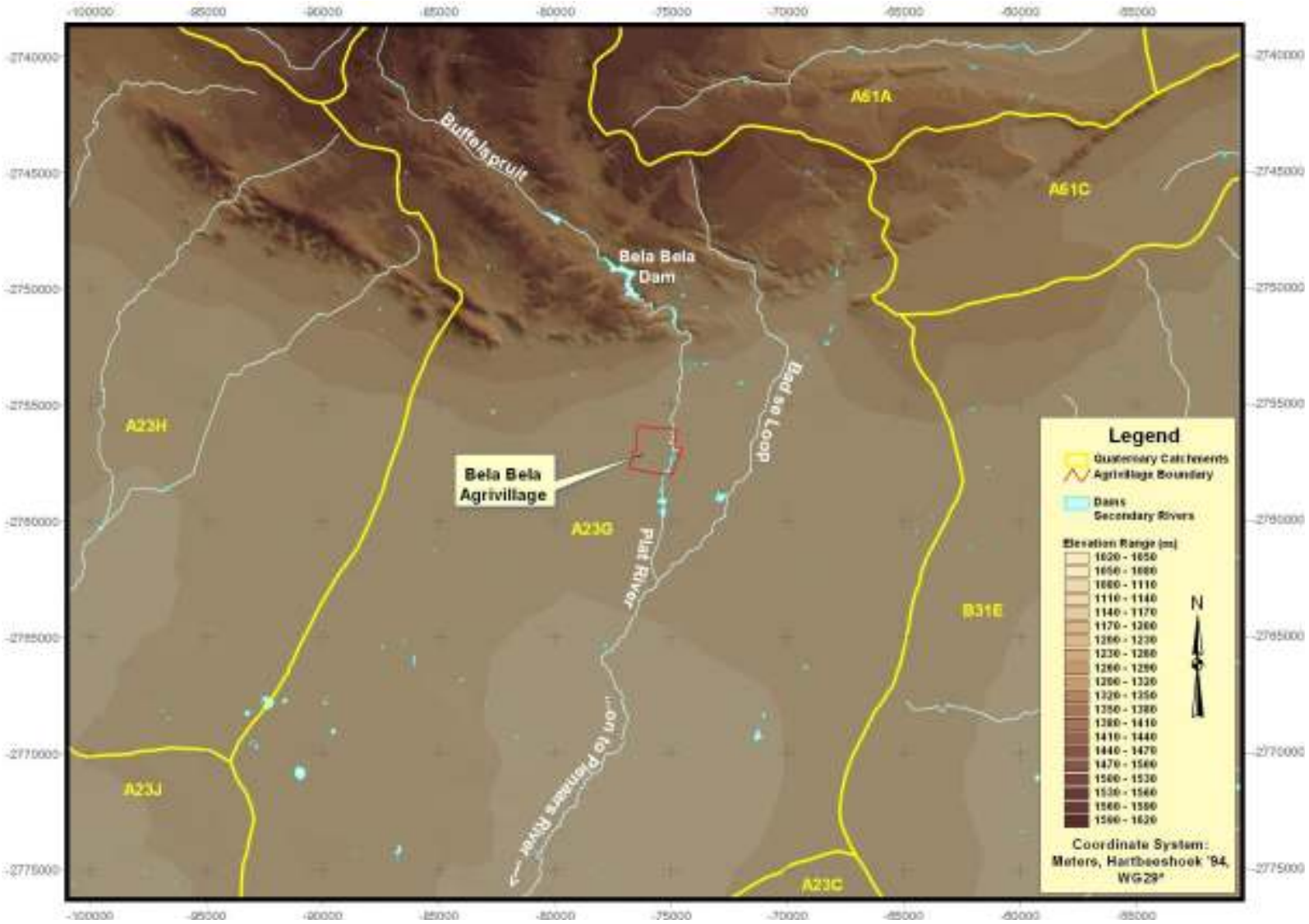

Figure 9: The quaternary catchments surrounding the Bela-Bela Agrivillage study area, drawn on a background of a Digital Terrain Model (DTM), showing the elevation range in meters above mean sea level. This drawing shows the Plat River up to its confluence with the Bad-se-Loop stream

= 75 433m^3/annum or 206 m^3/ day

As no long-term water levels and abstraction rates are available the above evaluation is based on the best knowledge and experience available. However it is strongly advised that a proper management and monitoring programme be implemented to ensure that the groundwater resources protected. This should include:-

- Identify suitable monitoring boreholes;
- Monitor water levels and abstractions;
- Take water samples at least twice annually and analyse for microbiological and macro elements; and
- Implement management and monitoring programme together with neighbours to obtain a greater regional perspective.

During the assessment undertaken in 2011 the following was found:
Taking harvest potential into consideration, 28.542 Mm^3 is available in A23G for use. The site comprises an area approximately 3.5 km^2, so therefore the amount of groundwater allowed to be abstracted from the aquifer is approximately 106 290 m3/a. The amount of water required for the development is approximately 87 500 litres per day or 31 937 500 litres per year (31 937.5 m^3/a).

It can be concluded that based on the reserve calculation, there is sufficient water in the catchment that can be used and does not exceed recharge. It can further be concluded that, based on the abstraction rate of the pumping test there is sufficient water to support the proposed development.

It is recommended that the groundwater be managed in a sustainable manner. The groundwater management plan and a groundwater monitoring program should be established at the proposed development.

- Groundwater quality should be monitored annually. Water samples must be taken from selected boreholes using approved sampling techniques and adhering to recognised sampling procedures. Further recommendations can be made regarding the sampling and this will be discussed with the client.
- The monitoring data should be evaluated by a competent hydrogeologist to identify trends and modify the groundwater monitoring network if necessary.
- A monitoring network should be established and monitoring boreholes should be drilled to monitor potential contaminant sources once the site has been developed.

1.17.2 Water Use Authorisation

The following water use authorisations have been registered for groundwater the following properties:

Portion 3 of the Farm Noodhulp
7 935m^3/annum from a borehole

Portion 77 of the Farm Noodhulp
186 608m^3 / annum from a borehole

Total registered groundwater is thus 194 593 m^3/annum or 533 m^3/ day

The following water use authorisations have been registered for surface water for the following properties:

Portion 3 of the Farm Noodhulp
493 920Kℓ / annum from the Plat River

Portion 77 of the Farm Noodhulp
132 120 Kℓ / annum from the Plat River

Total registered surface water is thus 626 040 m^3/annum or 1 715 m^3/ day.

1.18 Climate

1.18.1 Temperature and precipitation

Bela Bela normally receives about 481mm of rain per year, with most rainfall occurring during summer. It receives the lowest rainfall (0mm) in June and the highest (95mm) in January. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Bela Bela range from 19.9°C in June to 28.8°C in January. The region is the coldest during July when the mercury drops to 2.7°C on average during the night (See Figure 10: Precipitation Regime at the Bela Bela Weather station (Weather Bureau 2010) and Figure 11: Temperature Regime at the Bela Bela Weather station (Weather Bureau 2010).

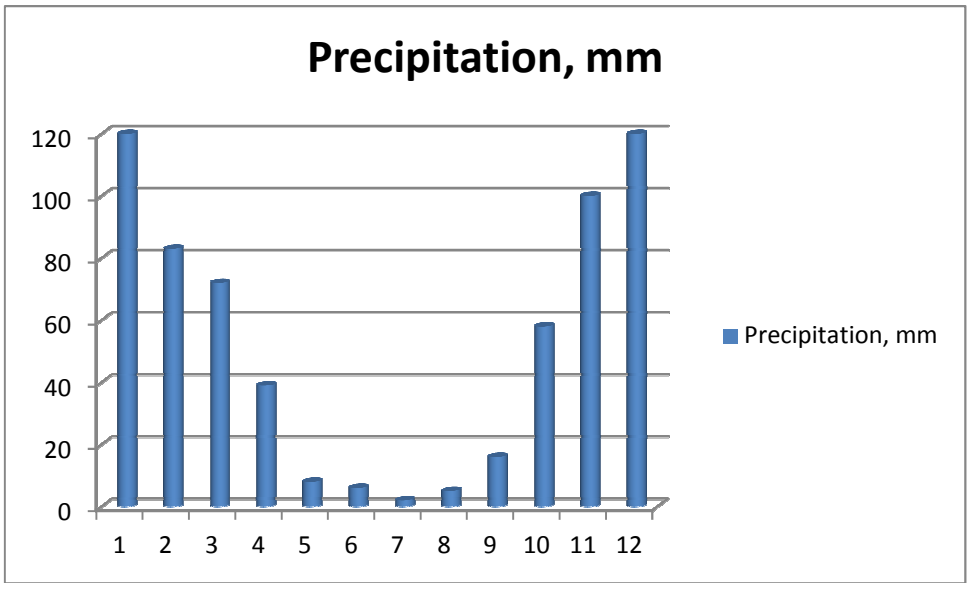

Figure 10: Precipitation Regime at the Bela Bela Weather station (Weather Bureau 2010)

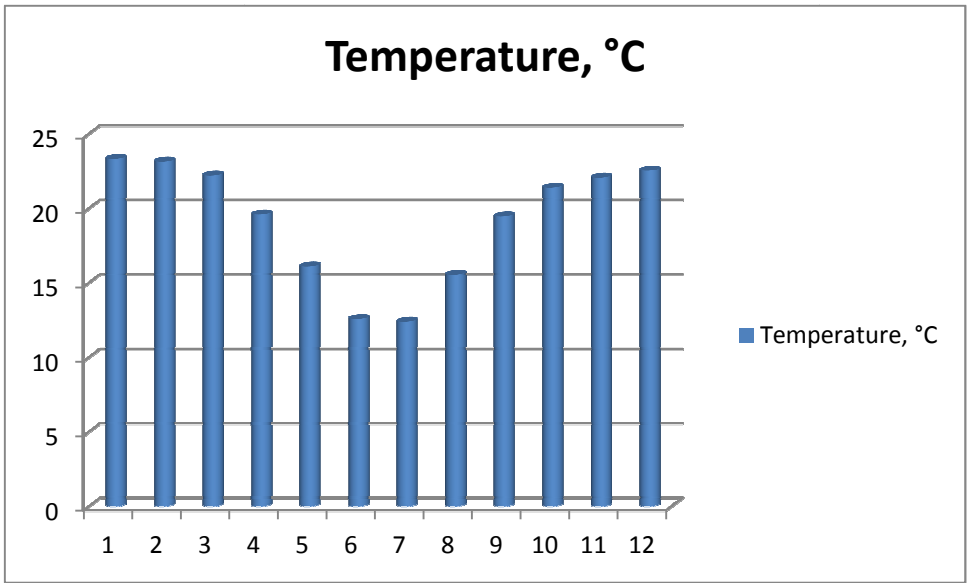

Figure 11: Temperature Regime at the Bela Bela Weather station (Weather Bureau 2010)

1.18.2 Wind

The wind regime largely reflects the synoptic scale circulation. The flow field is dominated by north westerly to north-north-easterly winds, with northerly winds clearly prevailing as may be expected due to the anticyclones that dominate the region through out much of the year. During winter-months (July - August), the enhanced influence of westerly wave disturbances is evident in the increase frequency of south westerly winds. An increase in the frequency of north easterly winds during spring months, and the continued prevalence of north westerly and northerly airflow, reflects the combined influence of anti-cyclonic subsidence and easterly wave systems (see Figure 12: Wind speed at the Bela Bela Weather station (Weather Bureau 2010).

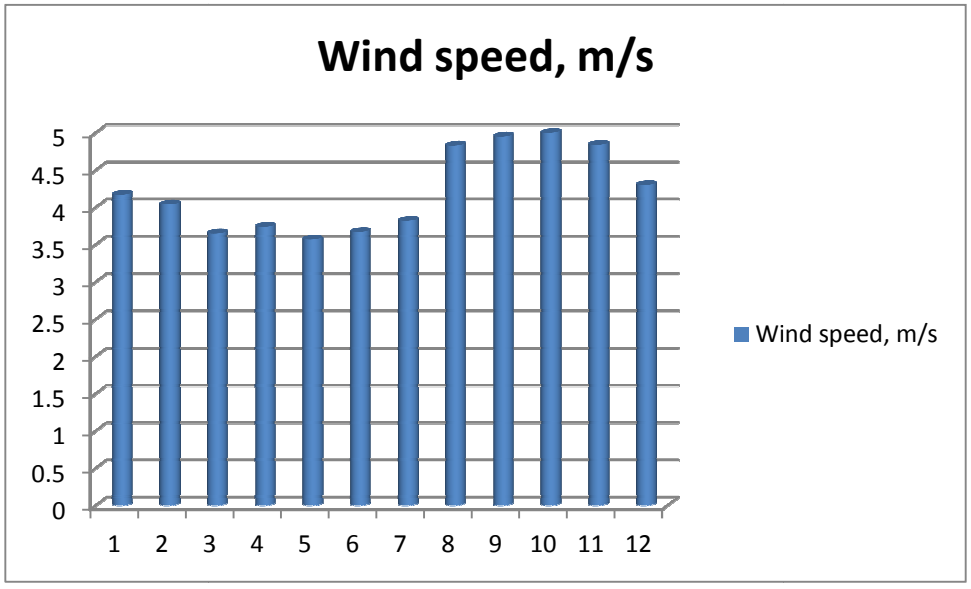

Figure 12: Wind speed at the Bela Bela Weather station (Weather Bureau 2010)

1.19 Flora

Vegetation typical of the Springbokvlakte Thornveld (Mucina & Rutherford 2006) is found within the western and central sections of the property surrounded by old cultivated fields.

This vegetation unit is classified as endangered (Mucina and Rutherford 2006). Conservation target is set at 19%; only 1% of this vegetation unit is statutorily protected, mainly within the Mkombo Nature Reserve, Rust de Winter. At least 49% is transformed including 45% cultivated and 3% urban and buildup. Scattered alien plants are present over wide areas including *Cereus jamacaru*, Eucalyptus species, *Lanatana camara*, *Melia azedarach*, *Opuntia ficus* –indica and *Seabania punicea*. Erosion is low to moderate (Mucina & Rutherford 2006).

The Vegetation Sensitivity Report indicated that most of the area consists of old cultivated fields (see Appendix H). Species dominating within these vegetation units are characteristically forb and pioneer grass species such as *Chloris virgata*, *Chloris pychnothrix*, *Setaria plumula*, *Cynodon dactylon*, *Aristida congesta* subsp. *congesta* and *Urochloa panicoides*. Forb species indicating disturbance within these areas are *Tribulus terrestris*, *Tagetes minuta*, *Verbena bonariensis*, *Conyza albida*, and *Alternathera pungens* occurring in high densities within these areas.

Heterogeneous vegetation cover and species distribution within these old land systems are due to micro edafic factors, disturbance created small depressions wherein water and humus congregates increasing the nutrient status of the area, supporting different species suites over the area. Old cultivated fields within the western section of the property are characterized by an almost mono-species dominance of *Hyperthelia dissoluta*, indicative of previous disturbance and weakened veld condition. Vegetation conditions within these areas are severely degraded.

Natural vegetation is found within a linear section stretching from the western to central section of the property. Vegetation structure of this area resembles natural heterogeneous Bushveld vegetation with a well developed tree, shrub and dwarf shrub components.

Herbaceous species composition in terms of production and palatability are good with species such as *Themeda triandra, Panicum maximum* and *Setaria sphacelata* forming a large part of the vegetation cover within this vegetation unit. Fire occurrence and historic over grazing might have been the causes of bush encroachment within this area.

1.19.1 Eucalyptus trees

A eucalyptus tree is like other trees in nature. Eucalyptus originated mainly in Australia and Indonesia. Today there are over 600 species belonging to the gender Eucalyptus. Among the main species used for commercial purposes are *Eucalyptus grandis, E. urophylla, E. saligna, E. camaldulensis, E. globulus, E. dunni, and E. nitens*.

Eucalyptus trees are known for their aggressive effect on the environment. It drains water, causes erosion and adversely affects the nutrient cycle and soil properties. Much of South Africa is greatly dependant on drainage and with the planting of Eucalyptus trees the surrounding environment has been greatly impacted on.

Much of South Africa is greatly dependent on catchment of rainfall in the mountains to supply the rivers and streams. When natural forests and grasslands were converted into eucalyptus plantations, stream flow reduced in much of the country. To counter this, South Africa has set up a licensing system that evaluates the possible consequence any proposed afforestation scheme is likely to have on water resources. Plantations are also being removed from riparian zones, thus encouraging the natural forests and grasses, which use less water, to regenerate. It has destroyed alien tree species and encouraged the cultivation of new drought-resistant species that use water efficiently.

Invasive alien plants pose a direct threat not only to South Africa's biological diversity, but also to water security, the ecological functioning of natural systems and the productive use of land. They intensify the impact of fires and floods and increase soil erosion. Invasive alien plants can divert enormous amounts of water from more productive uses and invasive aquatic plants, such as the water hyacinth, effect agriculture, fisheries, transport, recreation and water supply.

A recent study conducted a series of studies into the consumption of water in eucalyptus plantations. The data showed that, from an annual precipitation rate of 1299.0 mm, 57.1% (741.0 mm) was taken up by eucalyptus trees in the process of transpiration (which is the transfer of water from soil to atmosphere from absorption by plant roots and rhizomes), 9.8% of the total rainfall (128, 0 mm) was evaporated (evaporation is the direct transfer of water from the surface of plants and soil to the atmosphere). Between 0.5 to 1.3% (16.9 mm) were taken directly from the soil surface and 31.8% (414.0 mm) infiltrated the soil and replenish the water course.

Scientists and field workers use a range of methods to control invasive alien plants. These include:

- Mechanical methods - felling, removing or burning invading alien plants.
- Chemical methods - using environmentally safe herbicides.
- Biological control - using species-specific insects and diseases from the alien plant's country of origin. To date 76 bio-control agents have been released in South Africa against 40 weed species.
- Integrated control - combinations of the above three approaches. Often an integrated approach is required in order to prevent enormous impacts.

1.20 Fauna

The Waterberg falls between two distinct biospheres, namely the middleveld grasslands and sourveld to the east and the Kalahari thornveld to the west.

This meeting of biomes creates a converging crossover environment for animals, plants and birds which has, in turn, presented unique opportunities to conservationalists in the restocking of game sanctuaries. Birdlife, which is obviously free moving, has remained essentially undisturbed through the protection provided within this mountainous environment. Over 400 species of birds have been recorded across the greater Waterberg region making this one of South Africa's prime birding destinations.

All the principal game species, including elephant, rhino, leopard, buffalo and lion are present in the larger reserves along with hundreds of lesser species which offer great viewing and photo opportunities.

The plant life of the Waterberg includes some rare species, many endemic to the mountains including the rare cycad

Although no signs of mammals, reptiles or amphibians were recorded during the site visit the nature of the area predicts that small species still exist in this area.

1.21 Demographics

The statistics for Bela Bela in combination with the statistics for the Waterberg District Municipality is used to describe the broader social environment (http://www.demarcation.org.za). Bela Bela is one of the larger cities in Limpopo Province. Literacy in the area is relatively low with 8% of the population over 20 having attained Grade 8. Of the economically active population, 21.5% were unemployed in 2001 (see Figure 13: Employment status in Ward 2 of Bela Bela Local Municipality).

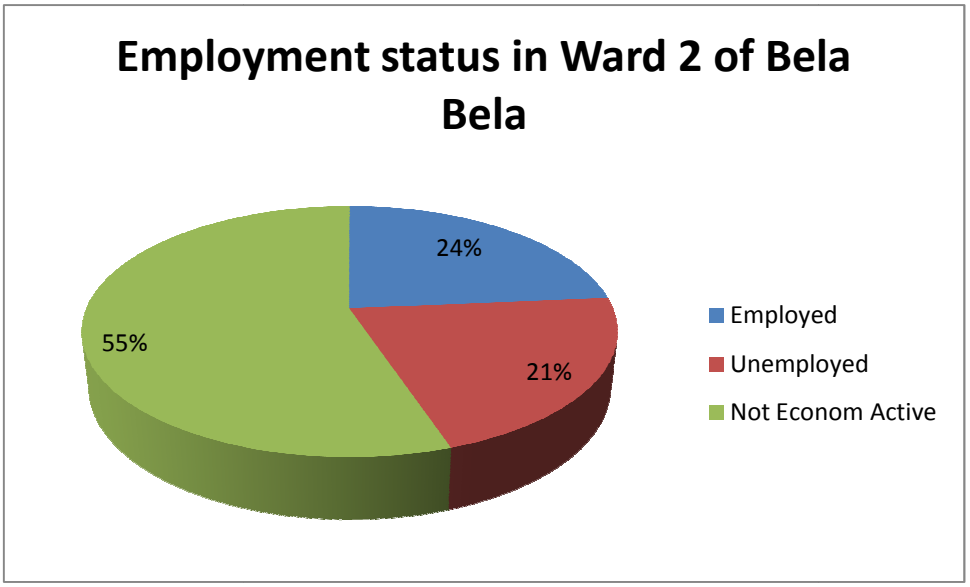

Figure 13: Employment status in Ward 2 of Bela Bela Local Municipality

The population of Bela Bela (according to the 2007 statistics) is estimated at 55 800 and is relatively young with 31% being between the ages of 20 and 40 in the Bela Bela area. The population for Bela Bela is approximately 4 994 326 people in 1 195 296 households; the average household has 4.1 people per household.

Although the formal residential areas are home to a well-educated and prosperous population, the vast majority of Bela Bela residents are poor. Approximately 75.4% earn less than R 800 pm in this area, and on average only 21% being un-employed; and 24% being employed.

The population in the Waterberg District Municipality increased with 1.4 million people since 1996 to a total of 55 800 people in 2007. The municipality also experienced a significant influx of people between 1996 and 2001. The largest part of the population falls in the economically active sector of society, between 21 and 50. The relatively low increase in the number of infants, combined with the high unemployment rate, suggest that the population increase is due to

economically active people seeking employment in the city. The male and female ratio is 61.1% female to 38.9% male.

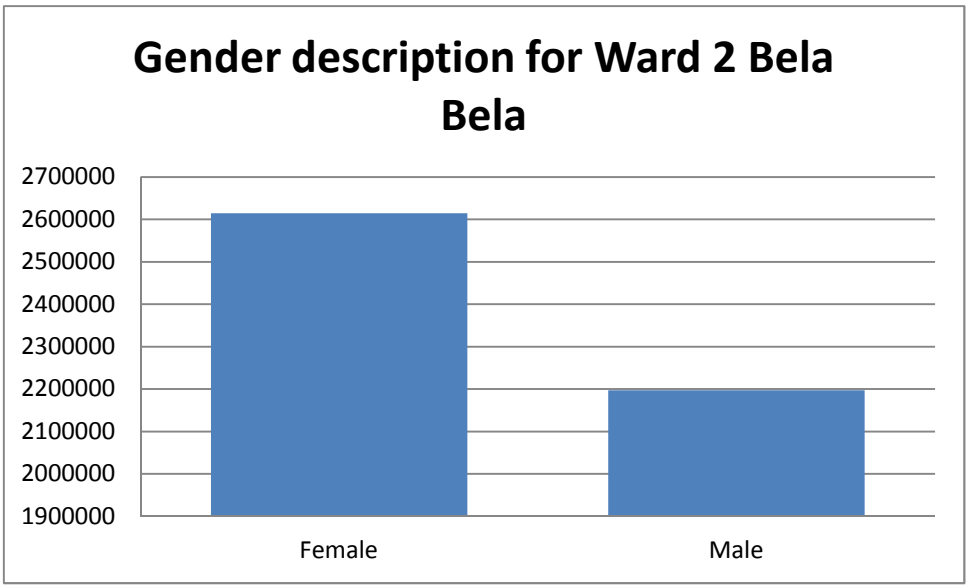

Figure 14: Gender description in Ward 2 of Bela Bela Local Municipality

Nearly thirty three percent (32.9%) of the households do have dependants in the Bela Bela Local Municipality. The majority of persons are employed in the retail and manufacturing sectors, followed by the social/community services, financial and commercial sectors. The majority of employed people are doing elementary jobs and working in the service industry, followed by a large number of people professionals and technicians.

The population growth and urbanization information indicates that in future greater pressure on environmental resources such as open space and water can be expected in the Bela Bela Local Municipality. Timeous planning is required to provide adequate infrastructure, especially in informal settlements where lack of infrastructure leads to water, soil and air pollution. The current growth rate of informal houses is 18.6%. In view of the fact that 35% of total households within this area are informal, this becomes a significant issue to address in future

1.22 Visual

The landscape of the study area is fairly flat with gently undulating hills and gentle slopes. Due to the scale and nature of the proposed development, the visual impact of the development on surrounding communities will be quite significant. Large portions of the application property can be seen from all cardinal directions.

This property will impose the greatest visual impact on the current landscape. Screening elements such as trees and berms, can soften the visual impact this development will have on the major roads which border the subject properties.

Due to the nature of the proposed development and the surrounding land uses, lights will illuminate the area at night; however the intensity is not considered to be high as the point of source lighting is dispersed over large distances. The establishment of a residential township of this nature, in the context of the surrounding land uses, is in line with the surrounding land uses.

The establishment of a formal, well landscaped development will establish an improved aesthetic appeal to the area.

The developer elects to retain the installation and hand over to the Body Corporate or Section 21 Estate Managing Body, luminaries will therefore be selected to suit the estate architectural theme. Street lighting will be controlled by means of adjustable photocells automatically switching the installation as natural light fades below preset allowable levels.

Presently, there is no existing street light installation on the site. The street lighting installation shall generally be designed in accordance with the requirements of the proposed Agri Lifestyle Village.

1.23 Heritage Resources

Based on what was found during the initial site evaluation and the recommendation of the EAP a Heritage Impact Assessment was undertaken. The Heritage Resources Act 25 of 1999 states:
Section 38 (3) of the National Heritage Resources Act, 1999 (Act 25 of 1999) states that subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-
(c) any development or other activity which will change the character of a site-
(i) exceeding 5 000 m^2 in extent
must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

The proposed development area lies in the valley south of the Waterberg and west of Bela-Bela. The area has been intensively farmed over a long period of time which would have destroyed any possible heritage sites.

At S 24° 55' 17.0" and E 28° 15' 18.5" there is an old farmhouse and outbuildings. The original farmhouse and garden most probably date to the 1940's. The house is surrounded by very large exotic trees and a vista of palm trees. The house has been altered in later years by adding a larger veranda.

Another old farm house originally stood at S24° 54' 37.4" and E28° 15' 27.3". At present all that is left of the original farm settlement are a number of old eucalyptus and other exotic trees. The original farmhouse has been replaced by a modern farmhouse dating to the 1990's.

No other important cultural heritage resources or graves could be found on the proposed development area.

1.24 Social Facilities

Public concern has raised the issue and it has been acknowledged that social facilitates in the Bela Bela Local Municipality area are lacking. Through the environmental process, the relevant or correct government bodies can be alerted. The issue of social facilities needs to be addressed by local municipalities and government bodies. The proposed development will create taxable land parcels, thereby increasing the income of the council. With these funds and additional pressure for

social facilitates, the correct authorities can be pressed for the establishment of schools, hospitals, public libraries etc. Facilities e.g. schools and churches for the local residents, can be developed through investment from investment groups and individuals.

7 APPROACH TO THE EIA

An Environmental Impact Assessment (EIA) is a good planning tool. It identifies the environmental impacts of a proposed development and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.
The EIA for this project complies with the National Environmental Management Act (1998) of the Department of Agriculture, Conservation, and Environment, and the NEMA EIA Regulations of the Department of Environmental Affairs and Tourism (DEAT). The guiding principles of an EIA are listed below.

1.25 Guiding principles of an EIA

There are eight guiding principles that govern the entire process of EIA and they are as follows:

- **Participation**: An appropriate and timely access to the process for all interested parties.
- **Transparency**: All assessment decisions and their basis should be open and accessible.
- **Certainty**: The process and timing of the assessment should be agreed in advanced and followed by all participants.
- **Accountability**: The decision-makers are responsible to all parties for their action and decisions under the assessment process.
- **Credibility**: Assessment is undertaken with professionalism and objectivity.
- **Cost-effectiveness**: The assessment process and its outcomes will ensure environmental protection at the least cost to the society.
- **Flexibility**: The assessment process should be able to adapt to deal efficiently with any proposal and decision making situation.
- **Practicality**: The information and outputs provided by the assessment process are readily usable in decision making and planning.

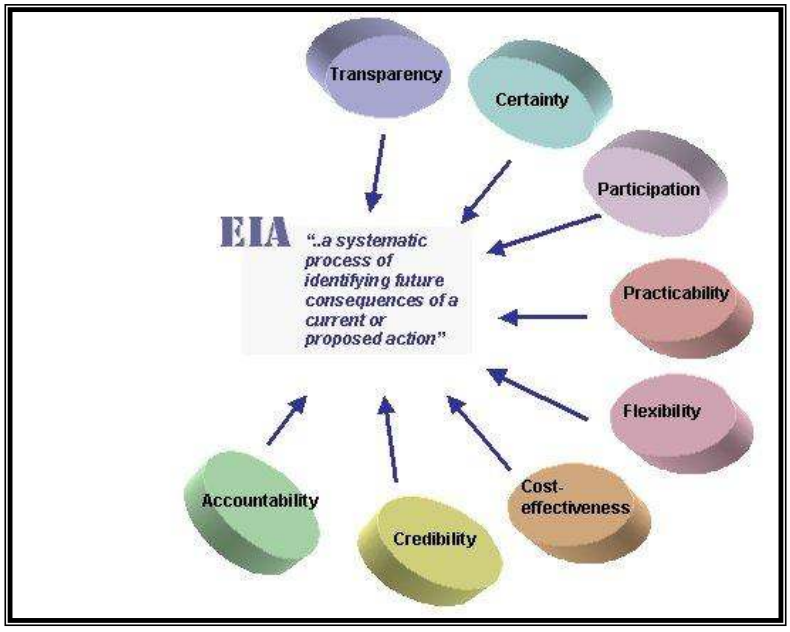

Figure 15: The eight guiding principles for the EIA process

There should be ongoing consultation with interested and affected parties representing all walks of life and sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should further be opportunities for input by specialists and members of the public and their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

1.26 EIA Process

1.26.1 Application for authorities

Since the land involved is zoned as agricultural land, the Department of Agriculture was approached early on in the process to explain the concept. The local Municipality was also contacted to ensure that the development type falls within the definition of a Lifestyle development according to the Bela Bela Spatial Development Plan (SDP). The Department of Environment, Economic Development and Tourism, Limpopo Province was also contacted early in the process in order to register the project for Environmental authorisation. A record is kept of correspondence with the department, these include the following stages:

- Submission of the application form (posted on 06/10/2008 see Appendix E).
- Accepting the application form and providing a reference number (20/10/2008 see attached Acknowledgement of Receipt in Appendix E).
- Review and accepting the Scoping Report; and
- Review and accepting the EIA report and draft EMP.

1.26.2 Information gathering

Early in the EIA process, the technical specialists identified the information that would be required for the impact assessment and the relevant data were obtained. In addition, the specialists sourced available information about the receiving environment from reliable sources, interested and affected parties, previous documented studies in the area and previous EIA Reports. The EIA team and specialists then visited the site to gain first-hand information and an understanding of the existing conditions and the proposed project, and to identify any alternatives that may be necessary.

1.26.3 Specialist studies

The following specialist studies have been undertaken already and the relevant information from these specialist studies will be incorporated into the EIA. These studies include:

- A Traffic Impact Assessment;
- A Heritage Impact Assessment;
- A Hydrological Assessment;
- A Social Impact Assessment;
- A Groundwater Assessment; and
- A Flora Assessment.

1.27 Public Participation Process

The principles of NEMA govern many aspects of EIAs, including consultation with interested and affected parties (I&APs). These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, to allow them to comment, and ensuring the participation of historically disadvantaged individuals, including women, the disabled and the youth.

1.27.1 Identification of interested and affected parties

Public Participation is the involvement of all parties who are either potentially interested or affected by the proposed development. The principle objective of public participation is to inform and enrich decision-making. This is also its key role in the Environmental Impact Assessment (EIA) process. Generally, the following information is included:

Interested and affected parties (I&APs) representing the following sectors of society have been identified (see **Error! Reference source not found.** for a complete I&AP distribution list):

- National, provincial and local government;
- Agriculture, including local landowners;
- Community Based Organisations;
- Non-Governmental Organisations;
- Water bodies;
- Tourism;
- Industry and mining;
- Commerce;
- Historically disadvantaged groups, including women, youth and the disabled;
- Research; and
- Other stakeholders.

1.27.2 Public announcement of the project

The project was announced as follows:
Publication of a media advertisement in The Post and the Limpopo Government Gazette on Friday, 14 November 2008 and Friday, 21 November 2008 respectively.

In order to inform surrounding communities and adjacent landowners of the proposed development, four (4) site notices were erected on site and at visible locations close to the site on Tuesday, 2 December 2008.

Key stakeholders, who included the abovementioned sectors, were directly informed of the proposed development by e-mail and fax on Friday, 14 November 2008.

Distribution of Background Information Documents and Registration and Comment sheets by fax/post/email to I&APs on Friday, 14 November 2008:

- Letters were hand – delivered to adjacent landowners on Friday, 14 November 2008, notifying and informing them of the proposed development.
- I&APs were given 30 days to comment and / or raise issues of concern regarding the proposed development. The comment period expired on Friday, 11 December 2008.

1.27.3 Meetings with I&APs

A public meeting was held on Wednesday, 25 March 2009. Minutes of the meeting is attached as an important component of the public participation process. The issues raised by the registered Interested and Affected Parties were captured and addressed in the Issues and Response Report (IRR).

1.27.4 Raising issues for investigation by EIA specialists

I&APs had the opportunity to raise issues either in writing, during the public meeting, by telephone, fax and/or email. Concerns raised, as well as responses to these concerns, are detailed in the Comment and Response Report (see **Error! Reference source not found.**).

All the issues raised by I&APs during the EIA process were captured in a Comment and Response Report (see) and I&APs received letters acknowledging their contributions.

1.27.5 Draft Scoping Report

All the issues raised to date were captured in this Draft EIA Report which is available in English. The EIA Regulations specify that I&APs must have an opportunity to verify that their issues have been captured. A period of four weeks was made available for public comment on the Draft Scoping Report. The availability of the Draft Scoping Report was announced as follows:

- personal letters, fax and e-mail to all the registered I&APs on the distribution list.

In addition, the Draft Scoping Report was distributed for comment as follows:

- left in public places (Bela Bela Library); and
- Hand-delivered to the relevant authorities;

Public review of the Draft Scoping Report was done by the following methods:

- Written comment, including email – a comment sheet requesting I&APs to respond to specific questions accompanied the report; further written submissions were encouraged.

1.27.6 Final Scoping Report

The comments received during the public review of the draft Scoping Report which was made available from Friday, 14 November 2008 to Friday, 11 December 2008 were incorporated into the Final Scoping Report.

The Scoping Report represents the initial identification of key issues or concerns as highlighted by the relevant authorities, interested and/or affected parties (I&APs) and professional judgement by the Environmental Assessment Practitioner (EAP).

In addition, the Scoping component of the EIA process allows for the identification of the anticipated impacts, particularly those, which require specialist investigations. The results of the specialist studies, a full assessment of the impacts and proposed Study area will form part of the EIA Report.

1.27.7 Draft Environmental Impact Assessment (EIA) Report

The EIA Regulations specify that I&APs must have an opportunity to verify that their issues have been captured. The Draft Environmental Impact Assessment Report will be available for public

review from Monday, 14 November 2011 until Wednesday, 25 January 2012. The availability of the Draft Environmental Impact Assessment Report was announced as follows:

- personal letters, fax and email to all the registered I&APs on the distribution list.

In addition, the Draft Environmental Impact Assessment Report was distributed for comment as follows:

- left in public places (Bela Bela Library); and
- Hand-delivered to the relevant authorities;

1.27.8 Public participation during the Impact Assessment Phase

Public participation during the Impact Assessment Phase of the EIA will revolve around a review of the findings of the EIA and inputs into the Environmental Management Plan (EMP). The findings will be presented in a Draft Environmental Impact Assessment Report and EMP and the volume of specialist studies.

8 ASSESSMENT OF BIOPHYSICAL AND CUMMULATIVE IMPACTS

The criteria for the description and assessment of environmental impacts were drawn from the Guidelines for EIA Regulations and in terms of the Environmental Conservation Act, 1989 (Act No 73 of 1989) [ECA]. Although the ECA EIA Regulations have been repealed the Guideline Document still provides good guidance for conducting impact assessments.

Activities to be undertaken in proposed development and its respective construction and operational phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into two phases from which impacting activities can be identified, namely:

a) ***Construction phase***:
All the construction related activities on site, until the contractor leaves the site.

b) ***Operational phase***:
All activities, including the operation and maintenance of the proposed development.

The activities arising from each of these phases have been included in the tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

1.28 Assessment Criteria

In determining what the impact of each phase of the project life cycle would be, the phases are broken down into associated activities or also referred to as aspects. As per the ISO 14001 definition an environmental aspect is an element of an organization's activities, products and/or services that can interact with the environment to cause an environmental impact, that is, a positive or negative change to the environment.

Furthermore, the methodology used is that each activity is related to each aspect individually and a rating is attributed to the associated impacts. Each impact is then finally evaluated according to certain parameters that are characteristic of that aspect.
The potential significance of every environmental impact identified is being determined by using a ranking scale as discussed below. The terminology has been taken from the Guideline Documentation on EIA Regulations, of the Department of Environmental Affairs and Tourism, April 1998.

Significance of Environmental Impact = Consequence (C) x Probability (P)
The Consequence of impacts can be derived by considering the:

- Magnitude (M);
- Duration (D);
- Spatial extent (S).

Magnitude relates to the severity of the impact. Duration relates to how long the impact may be

prevalent for and spatial extent relates to the physical area, which would be affected by the impact. Having ranked the magnitude (severity), duration and spatial extent using the criteria outlined in Table **6**: Consequence and probability ranking the overall consequence of impacts can be determined by adding the individual scores assigned to the magnitude, duration and spatial scale together. Overall probability of the impacts must then be determined. Probability refers to how likely it is that the impact may occur. Table **6**: Consequence and probability ranking outlines how to determine the probability.

Table 6: Consequence and probability ranking

Magnitude	Duration	Spatial extent	Probability
10 – Very high/don't know 8 - High 6 - Moderate 4 - Low 2 - Minor 0 – None	5 – Permanent 4 - Long term (impact ceases after operational life) 3 - Medium-term (5-15 years) 2 - Short term (0-5 years) 1 – Immediate	5 – International 4 - National 3 - Regional 2 - Local 1 - Site only	5 - Definite/don't know 4 - Highly probably 3 - Medium probability 2 - Low probability 1 - Improbable 0 – None

These ratings are adjudicated by judging each activity according to magnitude, duration, spatial extent and probability. The maximum value, which can be obtained, is 100 significance points (SP). Environmental significance is rated as either High, Moderate or Low significance on the following basis:

Combining the consequence of the impact and the probability of occurrence, the overall risk (significance) of impacts will be arrived at, thus accordingly a rating is attributed to each of these categories and a total significance is generated.

Consequence (magnitude + duration + spatial extent) x probability = significance points (SP).

That significance is defined as indicated in Table **7**: Impact Ratings.

Table 7: Impact Ratings

Low impact	1 → 30	The impact doesn't influence the decision making process.
Moderate impact	31 → 60	The impact influences the decision making process if not mitigated.
High impact	61 → 100	The impact influences the decision-making process even if mitigated.

If it is determined that the activity has a low significance then the decision can be made that the development should proceed without the need to put measures in place to manage the cause of the impact, or the effect of the impact itself. However if the significance rating is medium or high then that impact and the associated activity has to be thoroughly managed so as not to leave a lasting effect on the environment and to support the strategic intent of mine closure which inter alia seeks land optimisation in a sustainable manner.

NB: Although this system, like all others, is subjective, it aims to assess impacts in as systematic a manner as possible. This system has been successfully applied by many consultants for impacts associated with many large developments countrywide, and in the broader southern African context.

The EIA phase will thus focus on determining individual aspect related impacts, following on to link these aspect related impacts to either biological, physical, social, economical and or cultural spheres and in such develop a framework against which significance rating can follow and an EMP can be developed.

It will also be the intention of the EIA to result in an operational control framework against which the operation can measure and perform against the pre-determined Environmental performance and compliance objectives, also allowing for interim performance reviews and subsequent continual improvement initiatives.

IMPACT IDENTIFICATION AND ASSESSMENT METHODS

9 IDENTIFICATION OF KEY ENVIRONMENTAL ISSUES

The key environmental issues listed in the following section have been determined through:

- Views of Interested and Affected Parties;
- Specialist studies;
- Legislation; and
- Experience of the Environmental Assessment Practitioner (EAP).

This includes direct contact with both local and provincial as well as national authorities as well as surrounding landowners. Comments were also invited from stakeholders in the area through advertisements in the local newspaper and on site.

1.29 Key Issues Identified During The Scoping/EIA Process

The key issues have been divided into Biophysical issues and Social issues and include the following:

Biophysical Issues:

- Issues related to surface water;
- Solid domestic waste causing water pollution;
- Accumulation of building rubble or cement causing water pollution;
- Spills from temporary toilets and bush ablution during constructions phase could cause water pollution;
- Fuel spills during construction and or operations could cause water pollution;
- Suspended solids being carried away due to surface runoff;
- Depletion of surface water sources;
- Issues related to groundwater;
- Issues related to air quality;
- Issues related to soils; and
- Issues related to fauna and flora.

Social issues:

- Issues related to aesthetic aspects;
- Issues related to land use and capability; and
- Issues related to the socio-economic aspects.

A summary of the key issues is provided in Table 8: Summary of key issues below:

Table 8: Summary of key issues

Environmental Aspect	Relevant Area	Environmental Objective	Potential Impacts	Specialist Investigations	Potential Mitigation
PHYSICAL					
Wetlands	Regional	To ensure that the Plat River and other surrounding water resources are not adversely affected to the detriment of the environment and the surrounding communities; To prevent the disruption of catchment processes and functioning; To minimise erosion; and to Prevent surface and water contamination.	Disruption of habitats through development; Disruption of natural drainage patterns; Altered flow regimes as a result of hardened surfaces; and Potential contamination of surface and groundwater through the use of chemicals associated with garden maintenance.	Ecological Assessment; Aquatic Assessment	Appropriate no-development buffers around water courses, flood lines and wetlands. Use of biologically degradable herbicides and insecticides and/or biological control; and Stormwater Management Plan must be developed and implemented. Buffer zones around wetlands.
Terrestrial Ecology	Regional	To ensure that species of conservation importance are identified and preserved. To ensure that the ecological integrity and functionality of the system is maintained.	Fragmentation of habitat, loss of species of conservation importance, loss of biodiversity, disruption of natural processes and functionality.	Ecological Assessment	Delineation of sensitive habitats, species of conservation importance and migration corridors.

Environmental Aspect	Relevant Area	Environmental Objective	Potential Impacts	Specialist Investigations	Potential Mitigation
SOCIAL SURROUNDINGS					
Safety & Security	Site	To assure safety within the site, particularly to prevent trespassers from neighbouring communities.	Trespassers; Threat to safety of residents	Measures to ensure high level of safety and security to be specified in an Environmental Management Plan (EMP) for construction and operation.	High security with controlled access and constant monitoring.
Visual aspects	Regional	To minimise light and visual pollution; To ensure that the development blends in with the landscape character; and To maintain an undisrupted skyline.	Visual Impacts; Alteration of Landscape Character	Ensure that layout of proposed development blends in with the surrounding developments and environment.	Strategic locations in order to minimise the visibility of structures; Utilisation of colours and materials which blend in with the natural landscape, minimise the use of lighting and select low intensity lighting; and Non intrusive architectural design.
Traffic	Regional	To prevent traffic congestion as a result of the development.	Traffic impact on surrounding road network	Traffic Impact Assessment	Upgrading of the intersection of the access road and the surrounding road network in the Bela Bela Agri Lifestyle Village area.
Heritage and Culture	Regional	To ensure that all buildings, artefacts and symbols of culture and heritage significance are identified and preserved.	Loss of significant symbols of heritage and culture.	Heritage Impact Assessment	Identification and mapping of sites and artefacts worthy of preservation. Delineation of buffer zones.

1.30 Effect of Key Issues on the environment

The manner in which these issues can affect the environment is briefly outlined as follows:

Negative Impacts:

- Contamination of surface water as a result of the development and construction of the Agri Lifestyle Village in close proximity of the Plat River.

- Increased erosion and surface water run-off from man made drainage lines in close proximity to the construction sites as a result of vegetation clearance mainly during the construction phase.

- Impact on catchment processes and wetland mechanisms as a result of construction activities within the delineated wetland areas.

- Decrease in the water quality in the catchment area as a result of the construction and operational phases of the Agri Lifestyle Village.

- Floral destruction through vegetation clearing and earth works during the construction phase and the maintenance activities of the Agri Lifestyle Village during the operational phase.

- Habitat loss and destruction as a result of vegetation clearance and other pre - construction and construction activities.

- Faunal destruction (deaths) and displacement as a result of migration as well as possible impacts on the wetland and 1:100 buffers.

- Increased noise and dust generation from construction vehicles and other heavy-duty equipment during the construction phase of the proposed Agri Lifestyle Village; as well as the potential blasting activities should this be required.

- Visual intrusion as a result of the construction of the Agri Lifestyle Village.

- Destruction of heritage sites through clearance of historical buildings identified during the Scoping phase.

- Impact of personal safety and risk exposure of communities and individuals residing in the vicinity of the proposed Agri Lifestyle Village.

Positive Impacts:

- Urban Integration and infill:
  The project site represents a strategic infill site. The development will serve to enhance the integration of the farms to the east of Bela Bela with the Bela Bela town centre to the west.

- Coherent Planning:
  The effective and coherent planning of sub-regions has always been disrupted by the presence of pockets of "apartheid-style" development cut-off from each other by means of major infrastructure and physical elements. The development is therefore imperative in firstly integrating pockets of developments and secondly making use of existing bulk infrastructure and services such as the provincial road.

- Establishment of a sustainable living environment:
  The Bela Bela Local Municipality strive to establish a sustainable living environment for the inhabitants of the area by allowing local social supportive facilities to be provided. The Bela Bela Agri Lifestyle Village development aims to provide the following critical elements of the public environment:
    - Public Squares;
    - Markets;
    - Pedestrian walkways;
    - Public art; and
    - Green structure –trees, gardens, landscaping and natural open spaces.

- Economic upliftment
  A project like this will create positive spin-offs in terms of job creation for at least the construction period of the project. This economic opportunity must also be structured in such a way that it can establish long-term sustainable economic growth both in terms of skilled and unskilled labour and further in terms of establishment of permanent business and economic growth opportunities in Bela Bela. The proposed development aims at providing a mixed use development where people can live and work.

- Optimisation of bulk infrastructure
  The project will enhance infrastructure utilisation and it will contribute to speeding up construction of the proposed provincial and regional road infrastructure. Bela Bela Agri Lifestyle Village is located adjacent to an established township, which means that the site is bordered by bulk services.

- Environmental sustainability
  The proposed planning framework recognises and will accommodate any areas of environmental sensitivity. The sensitive planning around any identified natural features will be accommodated into public open space to the benefit of the community.

1.31 Identification of cumulative impacts

Cumulative impacts as illustrated below (Refer to Figure 16**: The identification of cumulative impacts**) occur as a result from the combined effect of incremental changes caused by other activities together with the particular project.
In other words, several developments or activities with insignificant impacts individually may, when viewed together, have a significant cumulative adverse impact on the environment.

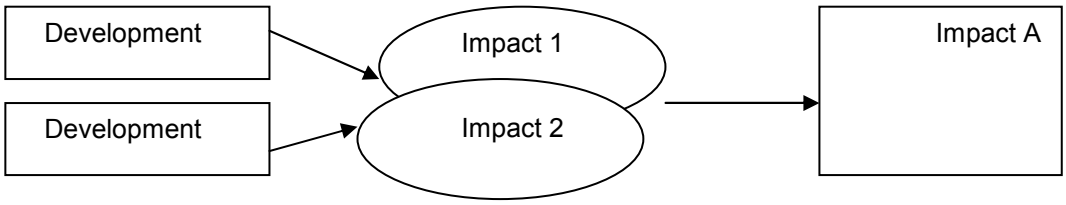

Figure 16: The identification of cumulative impacts

The following cumulative impacts have been identified during the undertaking of the specialists' studies in terms of the proposed development.

- Floral destruction;
- Habitat Loss and destruction;
- Faunal destruction (deaths) and displacement;
- Increased noise and dust generation; and
- Visual intrusion.

1.32 Specialist studies

As a result of the key impacts identified during the Scoping phase and comments received from the I&APs and other stakeholders, various specialist studies were conducted. The specialist studies conducted are:

- Traffic Impact Assessment;
- Motivating Memorandum;
- Wetland delineation;
- Aquatic assessment;
- Ecological assessment;
- Avi-faunal assessment; and
- Heritage assessment.

The findings and recommendations from the specialists' studies were used to inform the assessment of potential impacts on the environment as a result of the proposed development. They also served as guidelines in the compilation of mitigation measures and the EMP. The activities as described in the project description have been assessed on both an individual as well as a cumulative level for the project.

1.33 Feasible alternatives

1.33.1 Input alternatives

Various types of material can be used for the construction of the town centre development and its associated structures. These include different brick types (face brick, cement brick etc.) roof types (pitched or flat), finishes (paint colour, external lighting, landscape features etc.), road surfacing (asphalt, brick paving) and underground tank types. The proposed development should however be aesthetically pleasing, to adjacent landowners and should blend in with the adjacent developments.

Energy effective building construction and orientation have not been considered to date. However, the following recommendations regarding structural designs are recommended by the environmental consultant:

- Use of building material that requires excessive amounts of energy to manufacture should be minimised;
- Use of building material originating from sensitive or scarce environmental resources should be minimised. E.g. no tropical hardwood may be used;
- Building material should be legally obtained by the supplier, e.g. wood must have been legally harvested, and sand should be obtained only from legal borrow pits and from commercial sources;
- Building material that can be recycled / reused should be used rather than building material that can not; and
- Use highly durable building material for parts of the building that is unlikely to be changed during the life of the building (unlikely to change due to e.g. renovation, fashion, changes in family life cycle) is highly recommended.

1.33.2 Location alternatives

Originally no alternative locations have been considered by the proponent, as this location is owned by the proponent and therefore it is the only available site for this type of development. The investigation concluded that the subject location is the most suitable due to its ideal location in terms of the requirements of residence within the area and the various developments applications.

It was originally proposed that the total area should be included for residential, commercial and other development. Therefore the original area that was going to be developed would have been approximately 75Ha.

However stated earlier in the document subsequent to the site visit by the EAP and the specialist a wetland riparian area was identified and this motivated for the alternative layout of the township development. The new proposal is to utilise the wetland and floodline buffers as Public Open Spaces.

1.33.3 Layout alternatives

Following the site visit it was established that a portion of the area is abutted by a sensitive river flood line and associated riparian ecosystems. This discovery lead to additional specialist studies to be conducted for the sensitive ecological area. The conclusion of the specialist studies was that a buffer zone along the riparian area should be honoured. The buffer zone for riparian areas in residential areas is 32 meters; hence a portion of the total area was excluded for development purposes.

It was concluded that the wetland buffer zone will be incorporated into the total development by utilizing it for public open space. No construction of buildings will be allowed in this portion. The wetland buffer also takes the 1:50 flood line into consideration.

1.33.4 Status quo / No-go alternatives

One of the options to be considered for this report is one of no development at all. This will entail leaving the site in its present state. The site is currently utilised for Agricultural purposes. This would result in the site being unattended, uncontrolled and unmanaged which could subject the site to erosion and degradation, as no control mechanisms will be in place to ensure that environmental consequences are kept at a minimum.

It is imperative that this kind of resource is not left vulnerable to the causes and effects of urban decay and its negative economic and social implications.
Due to the fact that the site is ideally located along the road corridor and specifically connecting Bela Bela with Thabazimbi and forms part of the current development wave in the area, it is envisaged that the property value will demand site development in the short term if the site is not developed into an Agri Lifestyle Village development.

If this development should not get approval to continue the site will remain as it is; the riparian habitats identified on site will be exposed to human activities that might ultimately negatively impact these sensitive areas. The vegetation identified on site will be altered through the uncontrolled grazing of wild animals; this could result in the loss of specie variety.
Furthermore should the anthropogenic activities continue unchecked it could result in unnecessary stress on the already sensitive Plat River system.

1.33.5 Demand alternatives

The major land-use demand in Limpopo is for housing, commercial and industrial purposes. The area in which the site is located is bordering on an existing residential development (Bela Bela). Vacant land within the Bela Bela Local Municipality urban edge is a valuable commodity and resource. It is imperative that this kind of resource is not left vulnerable to the causes and effects of urban decay and its negative economic and social implications. This is already taking place on the site.

Development of the proposed project will transform a property, of which a large area can be classified as derelict in character, to an investment in the area and a resource to the surrounding community. Not only will this development provide formalized employment after construction to a number of individuals but it will additionally provide employment during especially its construction phase. The proposed development will furthermore create taxable land parcels, thereby increasing the income of the council.

The developer intends to develop the 75 ha site for commercial, industrial and residential purposes, which will allow the generation of income in this area of the Bela Bela Local Municipality.

It can be argued that the need and desirability for the proposed new development has effectively been proven with the establishment of the previous similar townships, mostly in the Western Cape Province. The provisions of the RSDF support the proposed land-use rights of the township as it refers to the implementation of the Regional Spatial Development Framework of the Bela Bela Local Municipality for this area. The proposed township as submitted will contribute to the implementation of the aforesaid Development Framework Plan, thus directly inline with the RSDF.

The proposed land-use rights make provision for the development of offices, training centres and conferences facilities as indicated in the corridor development plan.

1.33.6 Scheduling alternatives

It is recommended that construction takes place during the drier winter months to avoid any complications in the wet weather. No detailed information regarding the proposed time frame for the project is yet available. However, it is anticipated that construction starts as soon as possible all the necessary approvals are obtained.

1.33.7 Process alternatives

Process alternatives relate to design configurations of industrial and service facilities and are therefore not applicable on this project.

The determination of the significance lies at the core of impact identification prediction, evaluation and decision making (Rossouw, 2002). The process of identifying impact significance includes the following tasks:

- Impact identification;
- Impact prediction; and
- Impact evaluation.

The identification of the potential impacts of the proposed Bela Bela Agri Lifestyle Village development on the environment may include impacts that occur during the construction, operation and decommissioning of the Agri Lifestyle Village. After all potential impacts have been identified the nature and characteristics of the impacts can be assessed. For the purposes of the Environmental Impact Assessment Report; the term “assessment” refers to the purpose of collecting, organising, analysing, interpreting and communicating data relevant to some decisions. The assessment of the data was, where possible, based on accepted scientific techniques, failing which the specialists were to make judgements based on their professional expertise and experience.

10 DETAILED ENVIRONMENTAL IMPACT ASSESSMENT

10.1 Impacts on land

10.1.1 Impacts on geotechnical suitability

Table 9: Impacts on foundation structures and buildings

Nature	Collapse of buildings and structures		Status	-
Impact source(s)	Shallow sub-surface water seepage			
Affected stakeholders	Residents and adjacent land owners			
Magnitude	Extent	Local		
	Intensity	Low		
	Duration	Short		
	Reversibility	No		
	Probability	Probable		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of the impact:

The proposed Bela Bela Agri Lifestyle Village development has been divided into four geotechnical suitability zones, each with a distinct soil/rock profile and related geotechnical and/or development constraints. Except for Zone 2, the zones earmarked for the development are suitable providing the precautionary measures recommended are implemented.

There could be collapse of buildings and structures should specific founding recommendations and damp proofing measures as indicated the Geotechnical Report not be adhered to.

Operational Phase

The major constraints, suitability and limitations to the site development have been set out in the Geotechnical Report. Recommendations with regard to drainage, road construction, on-site sanitation and founding solutions have to be adhered to.

Significance:

The impact is considered to have a medium significance based on the impact identification matrix. Key factors contributing to the significance rating is the lack of proper ground water drainage and/or sub-surface drainage, as marshy conditions forming at the ground surface is a strong possibility during heavy and prolonged rainfall and could result in the collapse of buildings.

Mitigation:

Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan) and the Geotechnical Report (Annexure 3: Specialists reports). The impacts will become more pronounced if the suggested mitigation measures are not implemented.

10.1.2 Impacts on rate of erosion or siltation by wind or water

Table 10: Impacts on rate of erosion

Nature	Increased erosion or siltation by wind or water		Status	
Impact source(s)	• Vegetation clearing, • Site establishment, and • Movement of people and vehicles on site.			
Affected stakeholders	Residents and adjacent land owners			
Magnitude	Extent	Local, site		
	Intensity	Medium		
	Duration	Short		
	Reversibility	No		
	Probability	Probable		
Significance	Without mitigation		M	
	With m*itigation*		L	
Confidence	High			

Source of the impact:

The loss of topsoil will occur due to the initial vegetation clearing on site, the establishment of the construction camp as well as due to the movement of people and vehicles on bare ground on site. These areas are highly susceptible to erosion as the lower density of vegetation reduces the energy dissipation effect on water flow. This effect will be more pronounced on slopes, therefore increasing the erosion potential and the amount of sediment carried to the neighbouring waterways.

Description of the impact:

Construction phase

During construction, it will be necessary to clear the areas of vegetation, where the development will be placed. The site will need to be levelled which will ultimately alter the natural soil structure. It will also be necessary to stockpile building materials. The major impacts of vegetation clearance

is the exposure of soil to the agents of erosion, as vegetation stabilises the soil and retards the impacts of wind, rain and in many instances man.

The atmospheric transportation and the deposition of the eroded material can lead to siltation. Erosion can be expected if construction occurs within the rainy season and therefore may result in the loss of topsoil. The disturbance of vegetation will occur throughout the construction phase through the development of the proposed project.

Operational phase

The impact of soil erosion will become more pronounced if storm water management systems are not implemented appropriately. This would result in an increased flow towards the stream system in preferential pathways.

Significance:

The impact is considered to have a medium significance based on the impact identification matrix. Key factors contributing to the significance rating is the clearing and stripping of vegetation on site as this exposes the soil leaving it vulnerable to erosion by wind and water. Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan). The impacts will become more pronounced if the suggested mitigation measures are not implemented. The impact will last for the duration of the construction phase.

Mitigation:

The mitigation measures that can be implemented to eliminate or minimise negative impacts or result in the optimisation of positive benefits must, wherever possible, be expressed as practical actions.

Houses and other structures on residential stands must incorporate a permeable “apron” surrounding their foundations to allow water to infiltrate the soil instead of concentrating it in channels

Practical mitigation measures are set out in the detailed Environmental Management Plan for all impacts considered/discussed below (See Annexure 5: Environmental Management Plan).

10.2 Impacts on surface water systems

10.2.1 Impacts on surface water quality

Table 11: Impacts on water quality

Nature	Deterioration of water quality		Status	
Impact source(s)	Loss of wetland functionality as a result of an increase in pollutants.			
Affected stakeholders	Downstream water users			
Magnitude	Extent	Regional		
	Intensity	High		
	Duration	Long Term		
	Reversibility	Irreversible		
	Probability	Definite		
Significance	Without mitigation			H
	With mitigation			M
Confidence	High			

Source of the impact:

The absence of a buffer zone in the majority of the study area could result in a direct input of pollutants, including fertiliser derived nutrients such as nitrates and phosphates into the riparian areas. These pollutants and others are transported by storm water runoff, which picks up sediment load along its path, which further decreases the water quality. The Plat River is a bedrock river with shallow soils on the banks of its riparian zone. These soils with their mainly tree dominated vegetation therefore have a low potential for filtering and absorbing, as well as adsorbing, transported pollutants before they reach the main water body.

Description of the impact

Due to the fast moving water the river pollutants are unlikely to build up locally, but will be transported downstream to slower moving areas (e.g. dams) where they will increase in concentration and decrease the water quality.

Significance

The significance of the impact is expected to be of a high significance without mitigation, this due to the transport of pollutants to slower moving areas where there could be an increase in concentration of pollutants and a decrease in water quality. With mitigation the significance of the impact will be of a medium significance even though the impact will not be reversible and is of a permanent nature.

Mitigation measures

1. The areas cleared of vegetation and impacted on by excavation must be managed to prevent dust pollution and sedimentation of storm water channels. Excavated soil material must be correctly located and preferably covered to prevent erosion of the soil and siltation of storm water channels;
2. If servicing and washing of the vehicles are to occur on site, there must be specific areas constructed for this activity. These areas need to have a concrete foundation, bunded as well as have oil traps to contain any spillages likely to occur.
3. A walled concrete platform, dedicated store with adequate flooring or a bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well ventilated areas.

4. All construction materials liable to spillage must be stored in appropriate structures with impermeable flooring, such as plastic liners for temporary storage areas.
5. Portable septic toilets must be provided and maintained for construction crews. Maintenance must include the removal without sewage spills.
6. In the case of pollution of any surface or groundwater, the Regional Representative of the DWAF must be informed immediately.

10.2.2 Impact on wetland function and ecology

Table 12: Impact on Wetland function and Ecology

Nature	Loss in the existing wetland related biodiversity, hydrological and recreational values and functions		Status	-
Impact source(s)	Construction of proposed development			
Affected stakeholders	Residents and adjacent landowners			
Magnitude	Extent	Local and regional		
	Intensity	High		
	Duration	Long Term		
	Reversibility	Irreversible		
	Probability	Definite		
Significance	Without mitigation			H
	With mitigation			M
Confidence	Medium			

Source of the impact:

Construction and operation activities related to the development, especially the creation of hardened surfaces in close proximity to riparian areas can have devastating and irreversible effects on these ecosystems. Excavation, infilling, draining, hardened structures, vehicle and people movement, as well as stock pilling are all construction and operational related impacts, which can destroy riparian areas by causing disturbance to their hydrological regime, which is the main driver of wetland functioning. Reduced infiltration, increased energy flows, erosion, desiccation and habitat destruction are the result of such impacts, which in most cases result in irreversible riparian damage.

Description of the impact

The loss of wetland habitat and the linear linkages formed by wetland habitat to other wetland areas inside the study area's direct catchment could become fragmented by the development. This will reduce the ability of the study area (wetland catchment) to maintain viable population numbers of various wetland dependant species due to a loss in connectivity. Wetland dependant species inside the site, wetland connectivity still provides a functional role for more common wetland dependant species and should also be taken into consideration. The same applies to the riparian habitat. Wetland and riparian connectivity is also important from a physio-chemical water quality and quantity management role, as wetlands in many cases provide the natural corridors for water drainage inside the study area. The importance of connectivity extends beyond the study area to include the upstream catchment as well the downstream catchment, which implies a loss to downstream water users should wetland functioning be compromised inside the study area.

Significance

The significance of the impact is expected to be of a high significance without mitigation, this due to construction activities causing a disturbance in the hydrological regime. With mitigation the

significance of the impact will be of a medium significance even though the impact will not be reversible and is of a permanent nature. The development layout has been amended. Temporary wetland zones that are still impacted are former agricultural lands that have no biodiversity value.

Mitigation

1. Development should not be considered within wetland boundaries and their associated buffer zones;
2. Interventions and mechanisms should be included in the proposed development to reduce the impact of stormwater on the wetland;
3. An ecologically sensitive stormwater management plan will be required to attenuate flood peak events and prevent excessive erosion; and
4. The natural open spaces in the proposed layout should be connected to adjacent natural open spaces.

10.2.3 Impact of Hydrological Modifications on Stormwater Flow and Wetland Erosion

Table 13: Impact of Hydrological Modifications and Stormwater

Nature	Modification of wetland hydrology and resultant increased stormwater flows and erosion		Status	-
Impact source(s)	Construction of hard surfaces in proposed development			
Affected stakeholders	Residents and adjacent landowners			
Magnitude	Extent	Local		
	Intensity	High		
	Duration	Long Term		
	Reversibility	Irreversible		
	Probability	Definite		
Significance	Without mitigation			
	With mitigation			
Confidence	Medium			

Source of the impact:

Hardened surfaces will impact negatively on the riparian area, as the construction of impermeable layers on the surface will prevent infiltration and ultimately result in reduced seepage yields.

Description of the impact

Increased stormwater runoff with an associated increased erosion potential are also directly related to the expansion of hardened surface inside a catchment. Interventions and mechanisms can be included in the development to facilitate a higher percentage of infiltration (e.g. porous pavements).

Significance

The significance of the impact is expected to be of a medium significance without mitigation, this due to removal of vegetation and the construction of hard surfaces. With mitigation the significance of the impact will be of a low significance even though the impact will not be reversible and is of a permanent nature.

Mitigation

1. Development should not be considered within wetland boundaries and their associated buffer zones;

2. Interventions and mechanisms should be included in the proposed development to reduce the impact of stormwater on the wetland;
3. An ecologically sensitive stormwater management plan will be required to attenuate flood peak events and prevent excessive erosion; and
4. The natural open spaces in the proposed layout should be connected to adjacent natural open spaces.

10.3 Impact on groundwater

10.3.1 Increased pollution of the groundwater and / or river water and an increase in other pollutants

Table 14: Impact on groundwater resources

Nature	Impact on groundwater resources as a result of pollutants		Status	-
Impact source(s)	Increased pollution of the groundwater and / or river water and an increase in other pollutants during the operational phase			
Affected stakeholders	Conservationists; Residents and adjacent landowners			
Magnitude	Extent	Site and Regional		
	Intensity	High		
	Duration	Long-term		
	Reversibility	Irreversible		
	Probability	Probable		
Significance	Without mitigation			M
	With mitigation			L
Confidence	High			

Source of the impact:

The increased pollution of groundwater resources and or rivers/drainage lines (ephemeral rivers) and localised higher levels of atmospheric pollutants could result in contamination of groundwater resources in the region.

Description of impact:

Fertilisers, herbicides and insecticides applied to domestic gardens and the public open spaces may seep into rivers and wetlands causing an increased nutrient load and contributing to eutrification of dams and waterways. The increased amount of vehicular traffic on the site could also increase the incidence of exhaust emissions within the area.

Significance

The significance of the impact is expected to be of a medium significance without mitigation, this due to the seepage of chemicals into the rivers and the contribution of eutrification of dams and waterways. With mitigation the significance of the impact will be reduced to that of a low significance even though the impact will not be reversible and is of a permanent nature.

Mitigation

Construction Phase

1. Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils. This should form part of the storm water management plan for the construction phase.
2. Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.

3. Concrete must be mixed on mixing trays or plastic liners. If mixing of concrete is to take place on exposed soil, this has to occur in demarcated areas that have to be bunded. This is so that the cement is not washed away during heavy rainfall events.
4. Portable septic toilets must be provided and maintained for construction crews. Maintenance must include the removal without sewage spills.
5. Conduct ongoing staff awareness programs so as to reinforce the need to avoid littering as this adds to the soil and ground water contamination. Contamination clearing specialists for the area must be identified and their details must be available at all times.

Operational Phase

1. If and when contamination is detected in the monitoring well or by the local municipality, a rehabilitation plan must be compiled and executed.
2. Store all litter carefully so it cannot be washed or blown into any of the water courses within the study area.

10.4 Impacts on ecological characteristics

10.4.1 Destruction of sensitive habitat

Table 15: Impact on loss of sensitive habitat

Nature	Destruction of sensitive habitat		Status	-
Impact source(s)	Construction activity, development footprint and access infrastructure			
Affected stakeholders	Conservationists; People with biodiversity interests; International community involved in species conservation and protection Residents and adjacent landowners			
Magnitude	Extent	Site		
	Intensity	High		
	Duration	Long-term		
	Reversibility	Irreversible		
	Probability	Probable		
Significance	Without mitigation			M
	With mitigation			L
Confidence	High			

Source of the impact:

Development of sensitive habitat types and the impact of development on sensitive habitat types, such as from road infrastructure etc. This will result in the fragmentation of species and habitats associated with important landscape elements such as wetlands and ridges that function on a landscape scale as corridors.

Description of impact:

The most sensitive habitats of ecological significance on the site are the riverine habitats. If impacted they will deteriorate downstream use and water quality and impact on the hydrology of the site. Impacts will also affect natural faunal migration and movement down these linear systems which act as corridors in the landscape. From an ecological point of view it is also very important that this report is taken into consideration when planning and layouts are determined. These sensitive areas have been demarcated as part of the specialist studies. There is no development on rocky outcrops, footprints are minimal, therefore impact without mitigation is medium.

Significance

The significance of the impact is expected to be of a high significance without mitigation, this due to the destruction of sensitive habitats that support a high ecological functioning site to allow for the building of the proposed development. With mitigation the significance of the impact will be reduced to that of a medium significance even though the impact will not be reversible and is of a permanent nature.

Mitigation

1. Footprint size should be kept at a minimum so as to maintain as much natural vegetation cover as possible;
2. Only vegetation indigenous to the area should be considered for landscaping purposes; and
3. Wastewater limit values applicable to discharge of wastewater into watercourses as stipulated by the Department of Water Affairs and Forestry should be strictly adhered to.

10.4.2 Destruction of faunal habitat and faunal displacement

Table 16: Impact of faunal habitat and displacement

Nature	Destruction of faunal habitat faunal displacement		Status	-
Impact source(s)	Construction activity Operational activity			
Affected stakeholders	Conservationists; People with biodiversity interests; Neighbouring farms and developments.			
Magnitude	Extent	Site		
	Intensity	Medium		
	Duration	Long-term		
	Reversibility	Irreversible		
	Probability	Probable		
Significance	Without mitigation			M
	With mitigation			L
Confidence	High			

Source of the impact

Destruction of faunal habitat and the displacement of species from their traditional home ranges during the construction phases of the proposed development.

Description of the impact

Faunal species could be displaced during the construction phase. This could result in higher than normal social, grazing and browsing pressures on areas that would otherwise not have these impacts. This could result in degraded vegetation cover in areas that the life stock has moved to and a depauperation in the associated habitat i.e. from trampling, erosion, grazing or browsing and other forces.

Significance

The significance of the impact is expected to be of a medium significance without mitigation, this due to the displacement of faunal species from their habitats on site to allow for the building of the proposed development. With mitigation the significance of the impact will be reduced to that of a low significance.

Mitigation

1. Minimising the loss of flora and fauna in areas that are not directly affected by the new development;

2. Reduce the levels of disturbance on the area during construction;
3. All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; and
4. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden.

10.4.3 Reduction of natural migratory routes and faunal dispersal patterns.

Table 17: Impact on natural migratory routes and faunal dispersal patterns

Nature	Impact on natural migratory routes and faunal dispersal patterns		Status	-
Impact source(s)	Barriers on the site during the operational phase			
Affected stakeholders	• Conservationists; • People with biodiversity interests; • Neighbouring farms and developments.			
Magnitude	Extent	Regional and possibly international in the case of migratory bird species		
	Intensity	High		
	Duration	Long-term		
	Reversibility	Irreversible		
	Probability	Probable		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of the impact

The introduction of barriers such as walls, buildings, roads and other infrastructure during the operational phase of the proposed development would have an impact on the natural migratory routes and faunal dispersal patterns.

Description of the impact

Walls, buildings, roads and other infrastructure associated with the development may obstruct and constrict faunal dispersal and floral dispersal by limiting and funnelling natural dispersal patterns.

Significance

The significance of the impact is expected to be of a medium significance without mitigation, this due to the constriction of natural migratory routes and faunal dispersal patterns. With mitigation the significance of the impact will be reduced to that of a low significance.

Mitigation

1. Sensitive areas e.g. wetland buffer and rocky outcrop should be demarcated to prevent access during the construction phase;
2. Reduce the levels of disturbance on areas indicated by the ECO as migratory routes along the Plat River;
3. All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; and
4. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden;
5. Use indigenous plants wherever possible in the landscaping of the property.

6. Try to maintain the natural vegetation in its original context as far as possible as this will enable species that are sensitive to transplanting to be maintained as well as their associated communities;
7. Maintain bush-clumps of indigenous vegetation if possible, as this acts as an island of habitat from which faunal species can move to and from while visiting the site. This will encourage wildlife into the property and will act to mitigate some of the inevitable habitat destruction and disturbance that will occur when construction is undertaken.
8. Construct in the winter months as this will reduce the impact that the disturbance will have on wildlife, as faunal species are less active at this time of the year. This will also help to mitigate against the possibility of erosion related damage to the environment as rainfall events will be minimalised.
9. Create linkages of natural vegetation between open areas on the property as this will encourage the property to flow but will also be of value to wildlife species when they forage and move within the property.

10.4.4 Increase in exotic vegetation

Table 18: Impact on increase in exotic vegetation

Nature	Increase in exotic vegetation		Status	-
Impact source(s)	Introduction of exotic vegetation during landscaping			
Affected stakeholders	Residents; Landowners			
Magnitude	Extent	Site		
	Intensity	Medium		
	Duration	Long-term		
	Reversibility	Reversible		
	Probabil*ity*	Probable		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of impact:

Landscaping associated with the development during the operational phase could cause an increase in the exotic vegetation on the site.

Description of the Impact:

<u>Operational Phase</u>

Exotic vegetation may be introduced to the environment via domestic gardening activities of the residents who will be moving into the area. If no mitigation is present some of these plants may further spread into the surrounding area increasing the opportunity for exotic plants to invade the surrounding vegetation.

Significance:

Processes such as urbanisation, acceleration of agricultural production and industrialisation have a drastic impact on terrestrial ecosystems through degradation, alteration of processes and the introduction (both intentional and unintentional) of many exotic species. In order to prevent the further destruction of the ecosystem, it is important to plan and co-ordinate human activities and

development so as to include studies of the natural environment involving soil, water, floral, faunal and cultural or historical aspects.

The impact is considered to have a medium significance based on the impact identification matrix. The key impact is that landscaping associated with the development during the operational phase could cause an increase in the exotic vegetation on the site.

Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan). The impacts will become more pronounced if the suggested mitigation measures are not implemented.

Mitigation:

1. Minimising the loss of indigenous flora and fauna in areas that are not directly affected by the new development;
2. Reduce the levels of disturbance on the area during construction;
3. All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; and
4. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden.
5. Footprint size should be kept at a minimum so as to maintain as much natural vegetation cover as possible;
6. Only vegetation indigenous to the area should be considered for landscaping purposes; and
7. Wastewater limit values applicable to discharge of wastewater into watercourses as stipulated by the Department of Water Affairs and Environment should be strictly adhered to.

10.4.5 Disturbance of fauna and flora

Table 19: Impact on the disturbance of flora and fauna

Nature	Disturbance of flora and fauna		Status	-
Impact source(s)	Activities of people during the operational phase			
Affected stakeholders	Adjacent landowners			
Magnitude	Extent	Site		
	Intensity	Low		
	Duration	Short term		
	Reversibility	Reversible		
	Probability	Definite		
Significance	Without mitigation			
	With mitigation			
Confidence				

Source of impact

Human encroachment and movement could disturb the occurrence of flora and fauna on the site.

Description of impact

Fauna and flora within the area may be disturbed by the activities of people on the site and on the property as a whole e.g. firewood collection, flower picking interfering with wildlife etc. This, if not controlled properly can lead to an impoverished ecosystem and reduction in biodiversity.

Significance:

The impact is considered to have a medium significance based on the impact identification matrix. The key impact is that human encroachment during the operational phase could disturb the occurrence of flora and fauna on the site.

Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan**Error! Reference source not found.**). The impacts will become more pronounced if the suggested mitigation measures are not implemented.

Mitigation:

1. Minimising the loss of indigenous flora and fauna in areas that are not directly affected by the new development;
2. Reduce the levels of disturbance on the area during construction;
3. All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; and
4. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden.
5. Footprint size should be kept at a minimum so as to maintain as much natural vegetation cover as possible;
6. Only vegetation indigenous to the area should be considered for landscaping purposes; and
7. Wastewater limit values applicable to discharge of wastewater into watercourses as stipulated by the Department of Water Affairs and Environment should be strictly adhered to.

10.5 Impact on the landscape

10.5.1 Impacts on loss of bushveld and vegetation patterns

Table 20: Impacts on loss of bushveld and vegetation patterns

Nature	Removing landscape elements that are fundamental in establishing a valued landscape character. This will affect landscape receptors of high sensitivity		Status	-
Impact source(s)	Removal of Bushveld and grassveld during construction phase.			
Affected stakeholders	Adjacent landowners; Regional landowners and residents; and Tourists			
Magnitude	Extent	Regional		
	Intensity	Medium		
	Duration	Long term		
	Reversibility	Reversible		
	Probability	Probable		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of impact

The development of the Bela Bela Agri Lifestyle Village in Bela Bela require the removal of large areas of Bushveld and grassveld in order to accommodate the proposed development. The conceptual layout plan of the development has been sensitively designed to retain most of the rocky outcrops and wetland / riparian vegetation. Due to the topography, vegetation and existing land use, the area has a moderate Visual Absorption Capacity (VAC).

Description of impact

The change from dense Bushveld and the long wavy texture of the existing grassveld creates a high visual contrast with the short and manicured grass associated with residential and commercial developments.

The removal of parts of the Bushveld and grassveld during the construction stage as well as the moderate VAC of the area and the high visual contrast will result in a severe landscape impact.

Significance:

The impact is considered to have a high significance based on the impact identification matrix. The key impact is the removal of large areas of Bushveld and grassveld resulting in a severe landscape impact during the construction phase.

Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan). The impacts will become more pronounced if the suggested mitigation measures are not implemented.

Mitigation:

1. Adhere to recommendations in the Geotechnical report.
2. Excavations must be checked by a qualified geo-technical engineer prior to any backfilling and/or foundation structures being put in place.
3. The contractors must co-ordinate their activities in order to optimise the utilisation of the excavated trenches and thereby prevent repeated and unnecessary excavations.
4. Construction that requires the clearing of large areas of vegetation and excavation should ideally occur during the dry season only. Construction during the rainy season (November to March) should be closely monitored and controlled.
5. The run-off from the exposed ground should be controlled with the careful placement of runoff barriers. The placement of the runoff barriers must occur in consultation with the ECO and as part of an overall storm water management system during the construction phase.
6. The soil that is excavated during construction should be stock piled in layers of no higher than 1.5m and protected by berms to prevent erosion of stock piles and loss of nutrients from top soil.
7. Audits must be carried out at regular intervals to identify areas where erosion is occurring. Appropriate remedial action, including the rehabilitation of the eroded areas, and where necessary, the relocation of the paths causing the erosion must be undertaken.
8. Environmentally sensitive design of the cross section of the drainage channel and formalisation of the retention pond.

10.5.2 Impact on change in surface cover

Table 21: Impact on change in surface cover

Nature	Removing landscape elements that are fundamental in establishing a valued landscape character. This will affect landscape receptors of high sensitivity		Status	-
Impact source(s)	Removal of Bushveld and grassveld during construction phase.			
Affected stakeholders	Adjacent landowners; Regional landowners and residents; and Tourists			
Magnitude	Extent	Regional		
	Intensity	Medium		
	Duration	Permanent		
	Reversibility	Reversible		
	Probability	Probable		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of impact

At present, the surface cover of the site comprises mainly of bushveld and grassveld with some roads and existing infrastructure. A large portion of the site is currently being used for grazing of livestock.

Portions of the vegetated surface cover will be cleared to make way for the proposed development. The exposed soil and the presence of construction equipment, material stockpiles, site offices and construction camps will contrast in colour and form with the receiving environment. The moderate VAC of the receiving environment will leave the construction activity exposed. The landscape impact will be moderate.

Description of impact

The construction areas will cause a noticeable change in character due to the lower VAC and the greater visual contrast between the construction site and the receiving environment.

The completed development will introduce foreign land uses that will alter the existing Bushveld and grassveld character. The completed development and landscaping of the open spaces around the buildings will be an improvement from the construction phase. During the operational phase, the landscape and buildings are expected to be maintained to a high visual quality. The landscape impact will be moderate.

Significance:

The impact is considered to have a medium significant impact as a result of loss of open space and transformation of the Bushveld and grassveld land cover. Mitigation measures reduce the impact to a low significance. Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan). The impacts will become more pronounced if the suggested mitigation measures are not implemented.

Mitigation:

1. The contractors must co-ordinate their activities in order to optimise the utilisation of the excavated trenches and thereby prevent repeated and unnecessary excavations.
2. Construction that requires the clearing of large areas of vegetation and excavation should ideally occur during the dry season only. Construction during the rainy season (November to March) should be closely monitored and controlled.
3. The run-off from the exposed ground should be controlled with the careful placement of runoff barriers. The placement of the runoff barriers must occur in consultation with the ECO and as part of an overall storm water management system during the construction phase.
4. The soil that is excavated during construction should be stock piled in layers of no higher than 1.5m and protected by berms to prevent erosion of stock piles and loss of nutrients from top soil.
5. Audits must be carried out at regular intervals to identify areas where erosion is occurring. Appropriate remedial action, including the rehabilitation of the eroded areas, and where necessary, the relocation of the paths causing the erosion must be undertaken.
6. Environmentally sensitive design of the cross section of the drainage channel and formalisation of the retention pond.

10.6 Impacts on heritage resources

10.6.1 Impact on loss of heritage resources

Table 22: Impacts on heritage resources

Nature	Loss of archaeological sites of high significant value		Status	-
Impact source(s)	Site development Earth works Destruction of heritage resources and graves Uncovering of archaeological findings			
Affected stakeholders	Residents; Landowners; and Tribal authorities/ancestry clans; Families of the deceased (graves)			
Magnitude	Extent	Local		
	In*tensity*	High		
	Duration	Long Term		
	Reversibility	Irreversible		
	Probability	Probable		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of impact

The proposed development area lies in the valley south of the Waterberg and west of Bela-Bela. The area has been intensively farmed over a long period of time which would have destroyed any possible heritage sites.

At S24° 55’ 17.0” and E28° 15’ 18.5” there is an old farmhouse and outbuildings. The original farmhouse and garden most probably date to the 1940’s. The house is surrounded by very large exotic trees and a vista of palm trees. The house has been altered in later years by adding a larger veranda (see photographs 1 and 2).

Another old farm house originally stood at S24° 54' 37.4" and E28° 15' 27.3". At present all that is left of the original farm settlement are a number of old eucalyptus and other exotic trees. The original farmhouse has been replaced by a modern farmhouse dating to the 1990's.

No other important cultural heritage resources or graves could be found on the proposed development area.

Description of the impact

Construction activities could damage the existing heritage resources. The construction crew could come across historical and/or archaeological findings. The increase of human activities on the site could negatively impact on the heritage resources on the site.

Significance

The impact is considered to have a high significant impact as a result of the construction phase of the proposed development in areas having a high significant occurrence of heritage resources. Mitigation measures reduce the impact to a medium significance. Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan). The impacts will become more pronounced if the suggested mitigation measures are not implemented.

Mitigation

1. Should any artefacts or remains be unearthed by construction or related activities, operations should cease immediately; the area fenced off and SAHRA notified promptly.
2. Should it be discovered that the artefact or remains are of cultural significance the area must be excluded from the proposed development in order to preserve the sites. The ideal situation would be to 'utilise' the heritage as part of the identity/image of the development.

10.7 Impacts on socio-economic environment

10.7.1 Impact on employment

Table 23: Impact on employment

Nature	Employment		Status	+
Impact source(s)	Labour required for development (during construction and operational phases)			
Affected stakeholders	Residents of the region Developers			
Magnitude	Extent	Regional		
	Intensity	High Positive		
	Duration	Medium- to long-term		
	Re*versibility*	Reversible		
	Probability	Definite		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of the impact

Creation of job opportunities during construction and operation for residents of the region.

Description of the impact

The construction phase of the development will provide numerous job opportunities to the skilled professionals (such as architects, quantity surveyors, civil engineers etc), less skilled trades (such

as bricklaying, painting, carpentry etc) as well as the unskilled and semi-skilled workers residing in the region. Due to the fact that the building of a single construction takes approximately 6 months to complete and that not all building will take place simultaneously, this development will provide substantial employment opportunities for an extended period of time.

During the operational phase of the development job opportunities will take on a more permanent nature in the form of commercial and retail activities etc.

Significance

The impact can be very negative if labour is sourced from elsewhere and the local residents are excluded from economic benefit to be gained from the construction of the Agri Lifestyle Village. Certainly, some skilled labour will have to be imported from other areas but unskilled labour is available, and if work is given to these people it will have a great benefit and have a very positive significant impact on the region as a whole.

Mitigation

1. If and where possible, the local community should be consulted when sourcing semi-skilled labour; and
2. Location of the construction camps to be negotiated with the relevant landowner on an individual basis.

10.7.2 Impact on traffic

Table 24: Impact on traffic

Nature	Increase in traffic on the surrounding network		Status	+
Impact source(s)	Increase in traffic on the surrounding network as a result of the proposed development.			
Affected stakeholders	Residents of the region Motorists using the road network			
Magnitude	Extent	Regional		
	Intensity	High		
	Duration	Medium- to long-term		
	Reversibility	Reversible		
	Probability	Definite		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of the impact

Development related traffic can access the external road network at various points and thereafter several route choices are available. Hence as one route or turn movement at an intersection becomes problematic other routes are available. The consequence of this is that the traffic increment dilutes as a function of increasing distance from the development but clearly, intersections and roads in proximity to the development will bear the brunt of the traffic increment.

Description of the impact

As discussed above, the R516 would be a source of increase in traffic during the operational phase, should road and intersection upgrade not be implemented.

Significance

The impact is considered to have a high significant impact as a result of the operational phase of the proposed development with regard to the increase in traffic at the intersections with the R516t. Mitigation measures reduce the impact to a low significance. Mitigation measures have been set out in the Environmental Management Plan (See Annexure 5: Environmental Management Plan). The impacts will become more pronounced if the suggested mitigation measures are not implemented.

Mitigation

Construction phase

1. All traffic management and road infrastructure must be conducted, designed and constructed according to the National Road Traffic Act. 93 of 1996.
2. Temporary signage and access routes must be implemented and be visible for safe and convenient access to the site. Preferably the implementation of this signage must be executed during non-peak hours. 10:00 -15:00.
3. Delivery and construction vehicles should access the site outside of peak hours i.e. from 10:00 to 15:00.

Operational phase

1. The site should preferably have separate entrances for all the portions of the proposed development. The business section in the north could be access via Tsamaya Avenue, the residential sections south of the railway line should have access from Dove Drive and the commercial section in area could be access from the proposed K16 a dual-carriageway provincial road that will run south past the proposed development.
2. Access could from the K16 be in the form of a traffic circle with the necessary signage and traffic calming measures.
3. The residential portions access from Dove Drive should have two entrances at the access point − one for residents and one for staff working in the offices. The entrance and exit booms should be operated via access cards and be monitored or managed by a reputable security company.
4. Access into the commercial section of the development must be recessed 50m into the site to ensure an appropriate number of vehicles to be accommodated without obstructing traffic. Further the intersection should be upgraded to a traffic light with necessary signage.
5. Where Dove Drive intersects with the railway line (road under rail) into the commercial area; the road should be no less than 13m wide, catering for four lanes of 3.2m. The clearance level should also increase to allow heavy vehicles to utilise this road.
6. Dedicated 20m long taxi stops must be designed as part of the entrance of the railway station. Incorporated into these taxi stops must be separate pedestrian entrances into the residential and commercial development to ensure that taxis do not stop at the entrance thereby obstructing traffic.
7. No advertising boards should be erected in close proximity to any of the access points because this would result in reduced visibility of the signage.

10.7.3 Change in Visual character of the area

Table 25: Assessment of the possible impacts on visual aspects

Nature	Disturbance of existing aesthetic environment as a result of visibility of the overburden stockpiles and other mine infrastructure		Status	+
Impact source(s)	Increase in visual receptors on the surrounding environment as a result of the proposed development.			
Affected stakeholders	Residents of the region			
Magnitude	Extent	Regional		
	Intensity	Medium		
	Duration	Long-term		
	Reversibility	Reversible		
	Probability	Highly likely		
Significance	Without mitigation			
	With mitigation			
Confidence	High			

Source of the impact:

The risk sources during the construction phase can be considered to be as follows:

- The image of the construction activity could lead to a perceived view of progress and benefit to the community;
- Excessive cleaning and stripping of topsoil for site offices, servitudes and access roads;
- The relative random and disorganised lay down of building materials, vehicles and offices;
- Cut and fill slopes of roads will become highly visible if not re-vegetated and shaped to blend in with existing topography;
- Dust from construction vehicles;
- Open and rehabilitated landscape scarring; and
- Location and layout of construction workers camp if located in proximity of works area.

All infrastructure relating to residential development operations are familiar landmarks within the region. Parts of the infrastructure may be noticeable from the R516 between Bela Bela and Thabazimbi.

Residential communities in the surrounding area will also be impacted by the visual intrusion. The risk sources during the operational phase can be considered as follow:

- Dust from heavy vehicles;
- Open and rehabilitated landscape scarring;
- Stockpile areas; and
- The operations associated with the access roads and surface infrastructure.

Upon the decommissioning of the Bela Bela Agri Village, the only structures that will remain will be the vegetated open fields and remaining buildings which could be utilised.

Description of the impact:

Table 26**:** **Visual Assessment Criteria (VAC) ratings** below rates each criteria from high, medium to low according to the specific characteristics of those criteria. Table 26**:** **Visual**

Assessment Criteria (VAC) ratings further lists for each project component the visual criteria rating and the visual impact of the component on these areas.

Table 26: Visual Assessment Criteria (VAC) ratings

	CRITERIA	HIGH	MEDIUM	LOW
1	Visibility	Very visible from many places beyond 1000 meter zone.	Visible from within the 1000 meter zone but partially obscured by intervening objects.	Only partially visible within the 1000 meter zone and beyond due to screening by intervening objects.
2	Genius Loci	A particular definite place with an almost tangible dominant ambience or theme.	A place, which projects a loosely definite theme or ambience.	A place having little or no ambience with which it can be associated.
3	Visual Quality	A very attractive setting with great variation and interest but no clutter.	A setting, which has some aesthetic and visual merit.	A setting, which has little aesthetic value.
4	Visible social structure	Housing and / or other structures as a dominant visual element.	Housing and / or other structures as a partial visual element.	Housing and / or other structures as a minor visual element.
5	Surrounding Landscape Compatibility	Ideally suits or matches the proposed development.	Can accommodate the proposed development without appearing totally out of place.	Cannot accommodate the proposed development without it appearing totally out of place visually.
6	Character	The site or surrounding area exhibits a definite character.	The site or surrounding area exhibits some character.	The site or surrounding area exhibits little or no character.
7	Scale	A landscape which has horizontal and vertical elements in high contrast to the human scale.	A landscape with some horizontal and vertical elements in some contrast to the human scale.	Where vertical variation is limited and most elements are related to the human and horizontal scale.
8	Visual Absorption Capacity	The ability of the landscape to easily accept visually a particular development because of its diverse landform, vegetation and texture.	The ability of the landscape to less easily accepts visually a particular development because of a less diverse landform texture and vegetation.	The ability of the landscape not to visually accept a proposed development because of a uniform texture, flat slope and limited vegetation cover.
9	View Distance	If uninterrupted view distances to the site are > than 5 km.	If uninterrupted view distance are < 5 km but > 1 km.	If uninterrupted view distances are >500m and < 1000m.
10	Critical Views	Views of the projects are to be seen by many people passing on main roads and from prominent areas i.e. communities and settlements.	Some views of the project from surrounding main roads and communities.	Limited views to the project from main roads and communities.

Table 27: Site evaluation

CHARACTERISTICS	VISUAL CRITERIA RATING	VISUAL IMPACT
Visibility	Medium to High	Moderate
Genius Locci	Medium to Low	Moderate
Visual Quality	Medium to Low	Low
Social	Medium to High	Low
Surrounding landscape compatibility	Medium to Low	Low
Character	Medium to Low	Moderate
Scale	High	Low
VAC	Low	High
View Distance	High	Low
Critical Views	High	Low

The result shows that the Bela Bela Agri Lifestyle Village has 1 high, 3 moderate and 6 low visual impact ratings.

The Bela Bela Agri Lifestyle Village will exert a negative influence on the visual environment. This is largely due to:

- High visibility of construction activity within a zone of uniform visual pattern;
- The low visual absorption capacity of the setting which is attributable to:
  - Relatively flat topography;
  - The low vegetation height (less than one meter);
  - The lack of visual diversity; and
  - A general lack of rising landforms as a backdrop.
- The size of the operations will expose it to many viewers; and
- The need to cut across or expose the existing landforms to accommodate the surface infrastructure.

Significance:

The significance of the impact is assessed to be low to medium.

Mitigation:

- Effective planning of the location of the Agri Lifestyle VIllage infrastructure and lighting to minimise visual impact and light pollution;
- Screen the plant from the surrounding roads and properties using, for example trees;
- The illumination of Bela Bela Agri Lifestyle Village operations should be focussed yet bear in mind safety and security issues. The design should make provision for accent lighting which should be downward to prevent light pills skywards;
- Selective and sensitive location and design of the lighting requirements for the Bela Bela Agri Lifestyle Village operations is required. For instance reduce the height from which floodlights are fixed and identify zones of high and low lighting requirements with the focus of the lights being inward rather than outward;
- The building textures and colours should not contrast vividly with the backdrop of colour and textures provided by the landscape. The natural setting and colours of buff, olive greens, dark brows should be respected and where possible, these should be incorporated into the materials used in the exteriors of the buildings and landscape;

- Colours of new infrastructure should be matt, not glossy so as to reduce reflection and glare from the surfaces. This is important when considering the night scene and reflected lights;
- The land forming and planting design of Bela Bela Agri Lifestyle Village should respect the surrounding indigenous vegetation. The interface between new planting and the existing should be gradually blended. Plant material around the main structures can be exotic, colourful and lush, however on the fringes of these areas the planting material should tend more towards local indigenous species of trees and grassland;
- The building forms should be broken by roof overhangs and steps in the façade. This will create shadow lines which, in turn, assist in the mottling breaking up of the visible plant form;
- The requirements for stabilisation of new landforms must be considered so that effective rehabilitation and re-vegetation can be timeously and effectively implemented. This will be determined by slope, access, material, climate etc.

Table 28: Summary of impacts

Environmental impact	Nature of impact	Extent of impact	Duration of impact	Intensity of impact	Probability of impact	Significance without mitigation	Significance with mitigation
Impacts on land	Low	Local	Short	Low	Probable	Medium	Low
Impacts on rate of erosion or siltation by wind or water	Medium	Local / Site	Short	Low	Probable	Medium	Low
Impacts on water quality	High	Regional	Long term	High	Definite	High	Medium
Wetland function and ecology	High	Local / Regional	Long term	High	Probable	High	Medium
Hydrological modification & stormwater flow	High	Local	Long term	High	Probable	Medium	Low
Increased pollution of groundwater	High	Site/Regional	Long term	High	Probable	Medium	Low
Destruction of sensitive habitat	High	Site	Long term	High	Probable	Medium	Low
Faunal habitat & faunal displacement	Medium	Site	Long term	Medium	Probable	Medium	Low
National migratory routes & faunal displacement patterns	High	Regional/International	Long term	High	Probable	Medium	Low
Increased exotic vegetation	Medium	Site	Long term	Medium	Probable	Medium	Low
Impact on disturbance of fauna & flora	Low	Site	Short term	Low	Definite	Medium	Low
Impacts on loss of bushveld and vegetation patterns	Medium	Regional	Long term	Medium	Probable	High	Medium
Impact on change in surface cover	Medium	Regional	Permanent	Medium	Probable	Medium	Low
Impacts on heritage resources	High	Local	Long term	High	Probable	High	Medium
Impact on employment	Positive high	Regional	Long term	Positive High	Definite	Medium	Positive High
Impact on traffic	High	Regional	Medium – long term	High	Definite	High	Low

Cumulative impacts as illustrated below, occur as a result from the combined effect of incremental changes caused by other activities together with the particular project. In other words, several developments with insignificant impacts individually may, when viewed together, have a significant cumulative adverse impact on the environment.

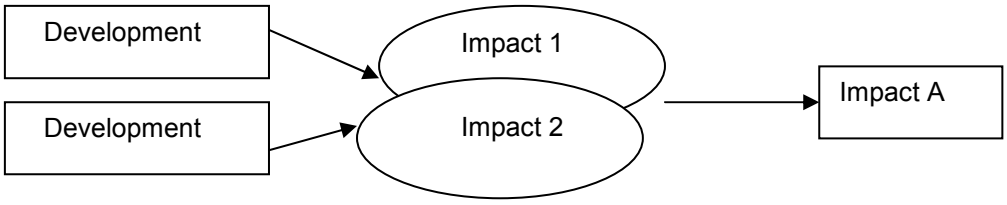

Figure 17: The identification of cumulative impacts

The following cumulative impacts have been identified in terms of the proposed development:

- Cumulative impacts on traffic as a result of more heavy vehicles making use of the roads in the immediate area;
- Cumulative impact on air quality as a result of the open cast mining operations as well as activities associated with this; and
- Cumulative impacts on the decreased quality of the water sources in the area as a result of contaminants being released into water sources.

11 CUMULATIVE IMPACTS

11.1 Cumulative impact of increased traffic volumes

Table 29: Cumulative impact: increased traffic volumes within the mine and surrounding communities

Activity	**Increased volumes of vehicular traffic**		
Nature of the impact	**Congestion on local roads emanating from increased traffic volumes**	Status	
Receiving environment	**Surrounding communities**		
Magnitude	*Extent (footprint; site; regional; national; international)*		**SITE**
	Intensity (low; medium; high)		**HIGH**
	Duration (short; short-med; medium; long; permanent)		**SHORT - MEDIUM**
	Probability (Improbable; possible; likely; highly likely; definite)		**LIKELY**
Weighting factor (WF)	*WF (low; low-medium; medium; medium-high; high)*		**LOW MEDIUM**
Mitigation Efficiency (ME)	*ME (high; medium-high; medium; low-medium; low)*		**HIGH**
Significance	*Without mitigation (WOM)*	*(Extent + Intensity + Duration + Probability) x Weighting Factor* *(2 + 5+ 2+ 3) x 2 = 24* *Low to medium*	
	With mitigation (WM)	*WOM x ME = WM* *24 x 0.2 =4.8* *Low*	
Significance With Mitigation (WM)	**LOW**		

Source of impact:
Traffic will increase in and around the proposed development. The increase of especially light vehicles movements surrounding the Bela Bela Agri Lifestyle Village project, such on National and Provincial roads which are in the vicinity of the Agri Village complex and link up to the project area. In addition to this traffic within the property boundary will also be a contributing fact towards cumulative impacts from an increase in traffic.

Description of the impact:
The proposed development entails the set up of residential activities as well as the construction of residential related infrastructure. Due to the nature of the activity it is likely that there will be a cumulative increase in vehicular traffic within the property boundaries and just outside the boundary of the property. The cumulative impacts emanating from the increase in traffic may become apparent during the construction phase of the Bela Bela Agri Lifestyle Village. The new internalised private road could significantly impact on the surrounding communities as long as it is unsurfaced. Temporary access roads could also contribute significantly to dust impacts, spills and erosion and loss of soil resources.

Significance of impact:
The transport of materials, people and goods may present the only significant impact. The movement of vehicles on the local roads within the surrounding communities may result in damage to roads from movement of heavy vehicles. Despite the potential cumulative impacts from the traffic increase it is not anticipated that the impact will have a ranking higher than medium for as long as the internal road are not in close proximity to the adjacent communities. As long as the roads are internalised, it is not anticipated that the cumulative impact of traffic will be significant.

Mitigation:
- Only main roads should be used;
- Limit the extent and degree of change to the biophysical and socio-economic environment; and
- Communicate with and acknowledge concerns of the I&APs and mitigate where possible.

11.2 Impacts on surface water quality

Table 30: Cumulative impacts of water quality

Activity	**Deterioration of water quality**	
Nature of the impact	**Loss of wetland functionality as a result of an increase in pollutants**	Status
Receiving environment	**Downstream water users**	
Magnitude	*Extent (footprint; site; regional; national; international)*	**REGIONAL**
	Intensity (low; medium; high)	**HIGH**
	Duration (short; short-med; medium; long; permanent)	**LONG TERM**
	Probability (Improbable; possible; likely; highly likely; definite)	**HIGHLY LIKELY**
Weighting factor (WF)	*WF (low; low-medium; medium; medium-high; high)*	**HIGH**
Mitigation Efficiency (ME)	*ME (high; medium-high; medium; low-medium; low)*	**MEDIUM**

Significance	*Without mitigation (WOM)*	*(Extent + Intensity + Duration + Probability) x Weighting Factor* *(3 + 5 + 4 + 4) x 2 = 32* *High*
	With mitigation (WM)	*WOM x ME = WM* *32 x 0.6 =19.2* *Low to Medium*
Significance With Mitigation (WM)	**LOW to MEDIUM**	

Source of the impact:

The absence of a buffer zone in the majority of the study area could result in a direct input of pollutants, including fertiliser derived nutrients such as nitrates and phosphates into the riparian areas. These pollutants and others are transported by storm water runoff, which picks up sediment load along its path, which further decreases the water quality. The Plat River is a relatively flat river with shallow soils on the banks of its riparian zone. These soils with their mainly tree dominated vegetation therefore have a low potential for filtering and absorbing, as well as adsorbing, transported pollutants before they reach the main water body.

Description of the impact

Due to the fast moving water the river pollutants are unlikely to build up locally, but will be transported downstream to slower moving areas (e.g. dams) where they will increase in concentration and decrease the water quality.

Significance

The significance of the impact is expected to be of a high significance without mitigation, this due to the transport of pollutants to slower moving areas where there could be an increase in concentration of pollutants and a decrease in water quality. With mitigation the significance of the impact will be of a medium significance even though the impact will not be reversible and is of a permanent nature.

Mitigation measures

1. The areas cleared of vegetation and impacted on by excavation must be managed to prevent dust pollution and sedimentation of storm water channels. Excavated soil material must be correctly located and preferably covered to prevent erosion of the soil and siltation of storm water channels;
2. If servicing and washing of the vehicles are to occur on site, there must be specific areas constructed for this activity. These areas need to have a concrete foundation, bunded as well as have oil traps to contain any spillages likely to occur.
3. A walled concrete platform, dedicated store with adequate flooring or a bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well ventilated areas.
4. All construction materials liable to spillage must be stored in appropriate structures with impermeable flooring, such as plastic lines for temporary storage areas.
5. Portable septic toilets must be provided and maintained for construction crews. Maintenance must include the removal without sewage spills.
6. In the case of pollution of any surface or groundwater, the Regional Representative of the DWAF must be informed immediately.

11.3 Destruction of sensitive habitat

Table 31: Impact on loss of sensitive habitat

Activity	**Destruction of sensitive habitat**		
Nature of the impact	**Construction activity, development footprint and access infrastructure**	Status	
Receiving environment	• **Conservationists;** • **People with biodiversity interests;** • **International community involved in species conservation and protection** • **Residents and adjacent landowners**		
Magnitude	*Extent (footprint; site; regional; national; international)*		**SITE**
	Intensity (low; medium; high)		**HIGH**
	Duration (short; short-med; medium; long; permanent)		**LONG TERM**
	Probability (Improbable; possible; likely; highly likely; definite)		**HIGHLY LIKELY**
Weighting factor (WF)	*WF (low; low-medium; medium; medium-high; high)*		**HIGH**
Mitigation Efficiency (ME)	*ME (high; medium-high; medium; low-medium; low)*		**MEDIUM**
Significance	*Without mitigation (WOM)*	*(Extent + Intensity + Duration + Probability) x Weighting Factor* *(2 + 5 + 4 + 4) x 2 = 30* *Medium to High*	
	With mitigation (WM)	*WOM x ME = WM* *30 x 0.4 = 12* *Low*	
Significance With Mitigation (WM)	**LOW**		

Source of the impact:

Development of sensitive habitat types and the impact of development on sensitive habitat types, such as from road infrastructure etc. This will result in the fragmentation of species and habitats associated with important landscape elements such as wetlands and ridges that function on a landscape scale as corridors.

Description of impact:

The most sensitive habitats of ecological significance on the site are the riverine habitats and the rocky outcrops and associated steep slopes. If impacted they will deteriorate downstream use and water quality and impact on the hydrology of the site. Impacts will also affect natural faunal migration and movement down these linear systems which act as corridors in the landscape. From an ecological point of view it is also very important that this report is taken into consideration when planning and layouts are determined. These sensitive areas have been demarcated as part of the specialist studies. There is no development on rocky outcrops, footprints are minimal, therefore impact without mitigation is medium.

Significance

The significance of the impact is expected to be of a high significance without mitigation, this due to the destruction of sensitive habitats that support a high ecological functioning site to allow for the building of the proposed development. With mitigation the significance of the impact will be reduced to that of a medium significance even though the impact will not be reversible and is of a permanent nature.

Mitigation

1. Footprint size should be kept at a minimum so as to maintain as much natural vegetation cover as possible;
2. Only vegetation indigenous to the area should be considered for landscaping purposes; and
3. Wastewater limit values applicable to discharge of wastewater into watercourses as stipulated by the Department of Water Affairs and Forestry should be strictly adhered to.

11.4 Destruction of faunal habitat and faunal displacement

Table 32: Cumulative Impact of faunal habitat and displacement

Activity	**Destruction of faunal habitat faunal displacement**		
Nature of the impact	**Construction activity** **Operational activity**	Status	
Receiving environment	• **Conservationists;** • **People with biodiversity interests;** • **Neighbouring farms and developments**		
Magnitude	*Extent (footprint; site; regional; national; international)*		**SITE**
	Intensity (low; medium; high)		**HIGH**
	Duration (short; short-med; medium; long; permanent)		**LONG TERM**
	Probability (Improbable; possible; likely; highly likely; definite)		**HIGHLY LIKELY**
Weighting factor (WF)	*WF (low; low-medium; medium; medium-high; high)*		**HIGH**
Mitigation Efficiency (ME)	*ME (high; medium-high; medium; low-medium; low)*		**MEDIUM**
Significance	*Without mitigation (WOM)*	*(Extent + Intensity + Duration + Probability) x Weighting Factor* *(2 + 5 + 4 + 4) x 2 = 30* *Medium to High*	
	With mitigation (WM)	*WOM x ME = WM* *30 x 0.4 = 12* *Low*	
Significance With Mitigation (WM)	**LOW**		

Source of the impact

Destruction of faunal habitat and the displacement of species from their traditional home ranges during the construction phases of the proposed development.

Description of the impact

Faunal species could be displaced during the construction phase. This could result in higher than normal social, grazing and browsing pressures on areas that would otherwise not have these impacts. This could result in degraded vegetation cover in areas that the life stock has moved to and a depauperation in the associated habitat i.e. from trampling, erosion, grazing or browsing and other forces.

Significance

The significance of the impact is expected to be of a medium significance without mitigation, this due to the displacement of faunal species from their habitats on site to allow for the building of the proposed development. With mitigation the significance of the impact will be reduced to that of a low significance.

Mitigation

1. Minimising the loss of flora and fauna in areas that are not directly affected by the new development;

2. Reduce the levels of disturbance on the area during construction;
3. All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; and
4. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden.

11.5 Reduction of natural migratory routes and faunal dispersal patterns

Table 33: Cumulative Impact on natural migratory routes and faunal dispersal patterns

Activity	**Impact on natural migratory routes and faunal dispersal patterns**		
Nature of the impact	**Barriers on the site during the operational phase**	Status	
Receiving environment	• **Conservationists;** • **People with biodiversity interests;** • **Neighbouring farms and developments**		
Magnitude	*Extent (footprint; site; regional; national; international)*		**REGIONAL**
	Intensity (low; medium; high)		**HIGH**
	Duration (short; short-med; medium; long; permanent)		**LONG TERM**
	Probability (Improbable; possible; likely; highly likely; definite)		**DEFINITE**
Weighting factor (WF)	*WF (low; low-medium; medium; medium-high; high)*		**HIGH**
Mitigation Efficiency (ME)	*ME (high; medium-high; medium; low-medium; low)*		**MEDIUM**
Significance	*Without mitigation (WOM)*	*(Extent + Intensity + Duration + Probability) x Weighting Factor* *(2 + 5 + 4 + 4) x 2 = 30* *Medium*	
	With mitigation (WM)	*WOM x ME = WM* *30 x 0.4 = 12* *Low*	
Significance With Mitigation (WM)	**LOW**		

Source of the impact
The introduction of barriers such as walls, buildings, roads and other infrastructure during the operational phase of the proposed development would have an impact on the natural migratory routes and faunal dispersal patterns.

Description of the impact
Walls, buildings, roads and other infrastructure associated with the development may obstruct and constrict faunal dispersal and floral dispersal by limiting and funnelling natural dispersal patterns.

Significance
The significance of the impact is expected to be of a medium significance without mitigation, this due to the constriction of natural migratory routes and faunal dispersal patterns. With mitigation the significance of the impact will be reduced to that of a low significance.

Mitigation
1. Sensitive areas e.g. wetland buffer should be demarcated to prevent access during the construction phase;
2. Reduce the levels of disturbance on areas indicated by the ECO as migratory routes along the Plat River;

3. All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; and
4. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden;
5. Use indigenous plants wherever possible in the landscaping of the property;
6. Try to maintain the natural vegetation in its original context as far as possible as this will enable species that are sensitive to transplanting to be maintained as well as their associated communities;

12 CONCLUSION AND RECOMMENDATIONS

The purpose of this report is to provide the relevant authority with sufficient information on the potential impacts of the proposed development, so that an informed decision can be made with regards to the authorisation of the proposed development. Potential impacts were identified in consultation with I&APs, and through the technical expertise and experience of Environmental Assurance. The report sought to ascertain the impact of the proposed development on the environment, of which we humans are part, and the probability of the impacts occurring.

The construction and operation of the Bela Bela Agri Lifestyle Village can pose various risks to the environment as well as the residents in the vicinity of the development. The issues related to the development were identified, discussed and assessed in terms of various criteria such as extent, duration, intensity and significance.

Public participation was adequately addressed in the scoping process as well as during the EIA process for the proposed Bela Bela Agri Lifestyle Village. In order to facilitate an open and transparent process, I&AP's were identified and notified of the proposed development. All issues and concerns were identified and by implementing the mitigation measures suggested by the specialists these can be managed and monitored effectively; thus minimising the effect on the surrounding environment.

A variety of mitigation measures have been identified that will serve to mitigate the scale, intensity, duration or significance of the impacts. These include guidelines to be applied during the construction and operational phases of the project. The Environmental Management Plan (EMP) contains detailed mitigation measures. Apart from this it is required that Bela Bela Local Municipality and projects over which they have operational control follow their strict environmental policies and standards, to ensure that the environment (physical and social) are taken into consideration in all phases of the project development.

It is submitted that the proposed mitigatory measures, if implemented, will reduce the significance of the majority of the identified impacts to "low", and that the proposed development should proceed.

The soil conditions on the site are strongly influenced by the presence of basalt. This will definitely influence foundations of structures, pavement design and stability of excavation slopes. However, these situations can be suitably compensated for through specific foundation design.

Evidence of groundwater seepage and a shallow water table was encountered in the test pits at the time of the Geohydrological study (see Annexure 3: Specialists reports). Notwithstanding this, the presence of the pedogenic material and intermittently leached horizons encountered in the profile is indicative of a seasonal shallow perched groundwater table from time to time.

Should the authorities decline the application, the 'No Go' option will be followed and the status quo of the site will remain. This will entail leaving the site in its present state. The site is currently vacant, although it use to be utilised for Agricultural purposes. This would result in the site being unattended, uncontrolled and unmanaged which could subject the site to erosion and degradation, as no control mechanisms will be in place to ensure that environmental consequences are kept at a minimum.
The area will still be prone to environmental degradation through live stock grazing, animal hunting by individuals, illegal dumping and the cultivation of crops on the riparian zone along the Plat River. Additionally the quality of the Plat River will further deteriorate due to anthropogenic activities and uncontrolled disposal of waste into the river.

Although, the construction and operation of a Agri Lifestyle Village could, potentially have negative impacts on the environment. These have been identified and can be effectively mitigated and monitored, significantly reducing the risk on the environment. The management of the negative impacts will require the implementation of the necessary mitigation measures (see Annexure 5: Environmental Management Plan)

This option therefore includes controlling and managing for the postulated effects that the proposed development may have on the environment. It is believed that with adequate management, the associated risks and impacts of the proposed development can be minimised or entirely negated.

It is therefore recommended, based on the assessment of the available information, that Alternative 2 be implemented. This will however require the use of certain mitigation measures, which are detailed in the EMP.

Based on the assessment of the available information it is recommended that the development alternative, should be followed, as the impact of the proposed development on the site and the surrounding areas is considered to be acceptable if all mitigatory measures are followed.

This Environmental Report was prepared in terms of the well-recognised Integrated Environmental Management procedure as well as the Environmental Impact Assessment (EIA) process followed is in compliance with the National Environmental Management Act, 1998 (Act 107 of 1998) [NEMA], as amended and the Environmental Impact Assessment Regulations of 2006 (Government Notice No's R385, 386 and 387 of 2006). The Bela Bela Agri Lifestyle Village development constitutes the listed activities which fall within the scheduled activities listed in Government Notice Regulation No 387 (Scoping and EIA).