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FINAL ENVIRONMENTAL IMPACT REPORT

PROPOSED TOWNSHIP ESTABLISHMENT AT ERMELO ON PORTION 6 OF THE FARM RIETSPRUIT 437 IS WITHIN MSUKALIGWA LOCAL MUNICIPALITY, GERT SIBANDE DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE, REF NO. 17/2/3GS-18

PREPARED BY

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FOR

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ON BEHALF OF

BONGIVELI CC

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September 2012

PROPOSED TOWNSHIP ESTABLISHMENT AT ERMELO ON PORTION 6 OF THE FARM RIETSPRUIT 437IS WITHIN MSUKALIGWA LOCAL MUNICIPALITY, GERT SIBANDE DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE

September 2012

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EXECUTIVE SUMMARY

1. Introduction

In order to fulfill its statutory, mandatory and contractual obligations to ensure the provision of reliable and affordable housing, Bongiveli CC intends to establish a township of 5771 sites on Portion 6 of farm Rietspruit within Msukaligwa Local Municipality. The proposed establishment covers approximately 413.65ha and thus is listed in Government Notice R544 and R545, as triggering impacts on the environment.

Mahlori Development Consultants on Behalf of Bongiveli CC has therefore appointed Dynamic Integrated Geo-Environmental Services (DIGES) to carry out an Environmental Impact Assessment in compliance with the EIA regulations, Government Notice R543. As part of the Environmental impact Assessment application for the proposed development, a scoping phase is to be undertaken. The scoping report therefore identified the issues that the environmental impact assessment will examine and the scope of the assessment required to ensure that the EIA will conform to the requirements of the National Environmental Management Act No. 107 of 1998 which was amended on the 18th June 2010.

PROJECT DESCRIPTION

The proposed project entails the construction of internal streets and the establishment of the following:

	Number of sites	
	Phase 1	***Phase 2***
residential erven	1284	4408
business stands	8	8
institutional erven	4	4
medical centre	-	1
taxi rank	-	1
Community facilities: Clinic	-	1
Crèche	-	3
Hall	-	1
Churches	1	2
Primary schools	1	1
Secondary schools	1	1
Administration facility	-	1
Public space	6	14

Private open space	3	5
Sports field	-	1
Mixed use	3	2
Cemetery	1	-
Gatehouse and access	1	4
TOTAL	**1313**	**4458**

In addition to the establishment of the erven, services such as bulk water supply, electricity, storm water drainage, sanitation and waste management services will also be provided.

The proposed development will be located on Portion 6 of Farm Rietspruit 437IS in Ermelo, It is situated approximately 4km south of Ermelo City Centre and can be accessed via N11 road. The area is located to the west of N11 road.

The global positioning co-ordinates are: **26˚ 34' 05.86"S; and 29˚ 58' 03.38"E**

The EIA process is being undertaken in accordance with the Environmental Impact Assessment Regulations as amended, Government Notice R543, emanating from Section 24 of the National Environmental Management Act (Act No. 107 of 1998).

2. Report Layout

This Environmental Impact Report (EIR) represents the outcome of the EIA process and contains the following sections:

Section 1: Background – deals with background of the project including the objectives of this EIA.

Section 2: Project description – locality, and technical details of the project, as well as alternatives considered.

Section 3: The receiving environment – a summary of the environment that will be potentially affected by the project activities.

Section 4: Administrative, Legal and Policy Requirements – all relevant requirements from applicable laws, and provincial and local regulations.

Section 5: Public Consultation– a summary of the consultation process undertaken with stakeholders and Interested and Affected Parties (I&AP's, and the issues identified during this process.

Section 6: Overview of specialist studies- a summary of the heritage, engineering services and Geotechnical studies that were undertaken.

Section 7: Alternatives evaluation – an evaluation of the environmental and social acceptability of the township layout.

Section 8: Potential impacts and Determination of Significance – An assessment of residual socio-economic and bio-physical impacts, expected during construction and operation of the agreed upon layout.

Section 9: Conclusions and recommendations

Section 10: References

Appendices: Appendices relating to Environmental Impact Assessment Phase are collated at the back of the document, referenced by the page number to which they relate.

3. Approach to the Study

A Scoping and Environmental Impact Assessment was prescribed to assess the damage that will be done during the project cycle (construction, operation and decommissioning) as the activities falls under 15 of Government Notice R545, 11(iii) and 22(i) of Government notice R544 which are stated in the table below:

Relevant Government Notice	**Activity**	**Description**	**Applicability**
R545, June 2010	15	**Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 ha or more**	Construction of residential, recreational and institutional erven on 413.65 ha
R544, June 2010	22 (i)	**The construction of a road, outside urban areas, with a reserve wider than 13.5 meters.**	Construction of access streets which are 19m wide.
R544	11(iii)	**The construction of a bridge where such construction occurs within a watercourse or within 32m of a watercourse measured from the edge of the water course excluding where such construction will behind the development setback line.**	Construction of a bridge with the following dimensions 6m (width), 1.5m (length) and 0.9m (height), and slope protection works

An application for the proposed project was submitted at the Department of Economic Development, Environmental and Tourism, Mpumalanga on the 21st of January 2011 and was assigned the reference no. 17/2/33-GS18. The scoping and plan of study submitted to DEDET on the 15th of July 2011, was approved on the 17th of October 2011. See **Appendix B.**

4. Public Participation

According to section 56 of the Environmental Impact Assessment Regulations, Government Notice 543 of 18 June 2011, consultation and public involvement are very important elements of the project development process. As part of the development process DIGES consulted with the local community and stakeholders by giving them the opportunity to consider the project in detail and addressing their concerns during the entire project duration.

During the scoping phase, as part of the public participation process, an advert was placed in the Highveld Tribune on the 12th of April 2011 informing the public about Bongiveli CC's intent to establish a township at Ermelo. In addition to the adverts, several site notices were placed in noticeable areas in the project area. Notification letters and Background Information Documents (BID) were given to the current inhabitants, Government Departments and the ward councillor of the area. DIGES held a public meeting within the project area to get the baseline environmental information and the public's perspective of the proposed township and how it would affect them. DIGES provided information on various issues throughout the consultation phases, and the issues raised were evaluated and taken into consideration during the environmental impact phase.

5. Alternatives

i. Location Alternatives

According to Msukaligwa Municipality IDP 2010/1011, the proposed area has been earmarked for residential development. The municipality has planned to use the land south of Ermelo town, west of the N11 road for housing development, location alternatives were therefore not considered.

ii. Activity Alternatives

Activity alternatives were also not considered due to the fact that the proposed project will provide adequate and well serviced houses to the residents.

iii. Demand Alternatives

Demand alternatives were not considered as the proposed project intends to address the need for housing by the residents within the town and surrounding area.

iv. Scheduling Alternatives

Scheduling alternatives will be discussed in the Environmental Management Programme, when the extent and severity of the expected impacts are addressed.

v. Site Layout Alternatives

Layout alternatives were not considered.

vi. No-Go Alternative

The activity is not located in an environmentally sensitive area and does not pose potential negative environmental impacts that cannot be successfully mitigated.

6. Environmental Impact Report

Key socio-economic and biophysical impacts expected from the construction and operation of the proposed township includes:

i. *Change in Physical and Chemical Characteristics of Water bodies:* the proposed township will be located close to the stream, and construction and operation activities can result in the contamination and sedimentation of the water bodies. A 100m buffer should therefore be placed from the edge of the temporary zone;

ii. Poor waste management practices may result in the pollution of the river. The impact is therefore rated **MEDIUM.**

iii. Disturbance associated with construction activities may lead to the introduction of alien species, the impact will be **MEDIUM.**

iv. *Destruction to vegetation.* The impact is considered to be of medium significance; since the area is generally in a good condition.

v. Archaeological materials were observed on site. Thus, the possibility of finding archaeological material is **HIGH;**

vi. The impact on palaeontology is **VERY LOW.** Paleontological materials are known to preserve well in ancient dunes. There was no indication, or signs of dunes on the site.

vii. The residual impact is expected to be **MEDIUM** if the mitigation measures are put in place.

viii. *Cumulative Economic Impacts:* the construction of the township will result in an increase in employment opportunities during the construction phase and the proliferation of businesses.

7. Conclusion and Recommendations

All biophysical and socio-economic impacts were assessed for the project area and the following conclusions and recommendations were made;

a. No major significant negative impacts were identified during the environmental impact assessment;
b. According to the specialist studies carried out on site, the township establishment is favoured over the NO-GO alternative.

The following recommendations must be included within the authorisation issued;

- The stipulations and provisions of the attached Environmental Management Programme on **Appendix K** be conveyed to and familiarised by the contractor and workers responsible for construction;
- Permits required by the developer from other competent authorities should be acquired before the commencement of the activity;
- A 100m buffer should be placed from the edge of the temporary zone;
- A waste management collection system must be established and the waste must be disposed of at a licensed facility;
- Formal demarcation design of the drainage lines must incorporate the placement of culverts in relevant places, and maintain the natural drainage;
- Areas near the stream should be no-go areas;
- Adequate erosion controls should be implemented when removing vegetation;
- No construction vehicles must be allowed to work within 100m of any stream;
- No go areas should be demarcated with tape;
- The applicant is reminded to take precautions during construction of the proposed project, should any archaic material be unearthed, construction should be halted immediately and SAHRA be notified.

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LIST OF ABBREVIATION

DEDET	Department of Economic Development, Environment and Tourism
DWA	Department of Water Affairs
DME	Department of Minerals and Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
IAP	Interested and Affected Parties
PPP	Public Participation Process
SAHRA	South African Heritage and Resources Agency

DEFINITIONS

1. **Affected environment:** Those parts of the socio-economic and biophysical environment impacted on by the development.

2. **Alternatives:** A possible course of action, in place of another, that would meet the same purpose and need (of proposal). Alternatives can refer to any of the following but are not limited hereto: alternative sites for development, alternative layouts or alternative designs, alternative processes and materials. In Integrated Environmental Management the so-called "no action" alternative may also require investigation in certain circumstances;

3. **Assessment:** The process of collecting, organizing, analyzing, interpreting and communicating data that is relevant to some decision.

4. **Development:** The act of altering or modifying resources in order to obtain potential benefits.

5. **Environment:** The external circumstances, conditions and objects that affect the existence and development of individual, organism or group. These circumstances include biophysical, social, economic, historical, cultural and political aspects.

6. **Environmental impact:** The degree of change in environmental components resulting from the effects of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of an organization's activities or may be indirectly caused by them.

7. **Environmental impact assessment:** A process of examining the environmental effects of a proposed development.

8. **Environmental issue:** A concern felt by one or more parties about some existing, potential or perceived environmental impact.

9. **Environmentally Sensitive Area:** An area designated in regional or local land use plans, or by a local, regional, provincial or federal government body as being

sensitive to disturbance or identified by an applicant as being sensitive for some reason.

10. **Erosion:** The process by which material, such as rock or soil, is worn away or removed by wind or water.

11. **Evaluation:** The process of weighing information, the act of making value judgments or ascribing values to data in order to reach a decision;

12. **Integrated environmental management (IEM):** Is a process of integrating environmental, Socio-economic and cultural factors in decision making to promote sustainable development. Principles underlying IEM provide for a democratic, participatory, holistic, sustainable, equitable and accountable approach.

13. **Mitigation:** the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

14. **Monitoring Programme:** The program for observing the potential environmental effects of a project, resolving specific outstanding environmental issues, and determining the action required based on the result of these activities.

15. **Scoping:** The process of determining the key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined;

16. **Stakeholder:** A stakeholder is any group or individual that may be potentially affected by a proposed project. Stakeholders typically include elected officials, government and non-government agencies, environmental and other special interest groups, developers, educators, landowners and members of the public.

17. **Study Area:** The area within the spatial boundaries of the scope of the environmental and socio-economic effects assessment.

SECTION 1: BACKGROUND

1.1 INTRODUCTION

Mahlori Development Consultants on Behalf of Bongiveli CC has appointed Dynamic Integrated Geo-Environmental Services (DIGES) to carry out an Environmental Impact Assessment in compliance with the EIA regulations, Government Notice R543. The application was made in terms of section 24 and 24D of the National Environmental Management Act (Act No.107 of 1998), of the listed activities published in the Government Notice No. R545 and R544 under section 24 of the above-mentioned Act and entail that a scoping and environmental impact assessment be undertaken.

PROJECT DESCRIPTION

The proposed project entails the construction of internal streets and the establishment of the following:

	Number of sites	
	Phase 1	***Phase 2***
residential erven	1284	4408
business stands	8	8
institutional erven	4	4
medical centre	-	1
taxi rank	-	1
Community facilities: Clinic	-	1
Crèche	-	3
Hall	-	1
Churches	1	2
Primary schools	1	1
Secondary schools	1	1
Administration facility		1
Public space	6	14
Private open space	3	5
Sports field		1
Mixed use	3	2

Cemetery	1	-
Gatehouse and access	1	4
TOTAL	**1313**	**4458**

In addition to the establishment of the erven, services such as bulk water supply, electricity, storm water drainage, sanitation and waste management services will also be provided.

1.1.1 EAP's Qualifications

Section 17 of EIA Regulations, Government Notice No. R543, clearly indicates that an EAP should be independent and have expertise in conducting environmental impact assessments, including knowledge of the Act, and any guidelines that have relevance to the proposed activity. The author of the report has two years experience in the environmental conservation field working on different projects. See the EAP's curriculum vitae on **Appendix A**.

1.2 NEED AND DESIRABILITY

The aim of this project is to provide the community with adequate well serviced houses and associated infrastructure.

Bongiveli CC therefore intends to establish a township at Ermelo on Portion 6 of Farm Rietspruit 437 IS. This proposed development will:

i. Cater for residential and communal facilities for the residents,

ii. Improve the socio-economic status of the local municipality.

1.3 SCOPING ENVIRONMENTAL IMPACT ASSESSMENT APPROACH AND METHODOLOGY

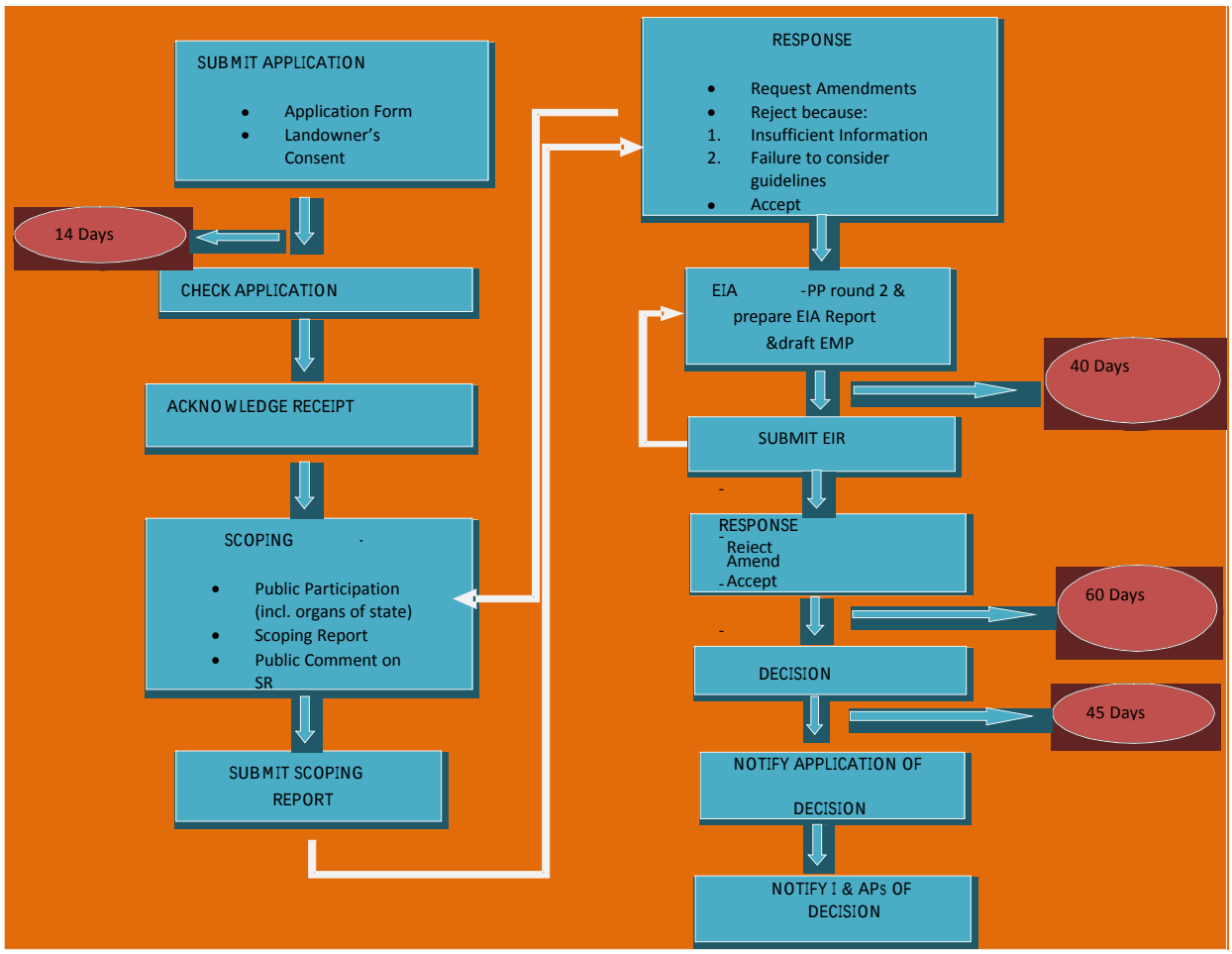
Before the project can commence, an authorization is needed from the Department of Economic Development, Environment and Tourism, in compliance with the Environmental Impact Assessment Regulations of 2010. The development is listed in terms of Government Notice R545 and R544 under Chapter 5 of the National Environment Management Act (Act No. 107 of 1998), and therefore requires an Environmental Impact Assessment to be undertaken. The application form has been submitted to DEDET. The scoping and Environmental Impact assessment approach and methodology described below are used for the proposed township establishment.

1.3.1 Scoping an Environmental Impact Assessment Phase

An environmental impact assessment is a proactive and systematic process where both positive and negative potential environmental impacts associated with certain activities are assessed. Every Environmental Impact Assessment project has two objectives namely, process and content objectives. The process objectives are to ensure that the process is open, transparent and inclusive, supplies stakeholders with sufficient information, affords them ample opportunity to contribute and makes them feel that their contributions are valued. The content objectives of the project are in the form of “hard” information: facts based on scientific and technical study, statistics or technical data.

Section 24(4) of NEMA prescribes that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must, *inter alia*, with respect to every application for environmental authorisation, ensure that the general objectives of integrated environmental management are taken into account. The Environmental Impact Assessment should include an investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. **Figure 1** below presents the EIA process to be followed for the proposed development.

Figure 1: EIA flow chart



1.3.2 Objectives of EIR

This environmental impact assessment has been undertaken in order to: primarily, satisfy the requirements of the environmental regulations promulgated on June 2010 in terms of section 24 and 24D of the National Environment Management Act, (Act 107 of 1998) which are as follows;

- Ensure that all relevant environmental legal requirements will be met by the proponent;
- Provide information on the proposed development by describing the nature and scale thereof;
- Describe the affected environment;
- Inform the public about the proposal and identify the main stakeholders and their concerns and values;
- Define the reasonable and practical alternatives to the proposal;
- Identify the likely beneficial and detrimental consequences of the proposal;

- Ensure that all environmental consequences are recognized early on and taken into consideration in the design, construction, operation and maintenance of the activity; and
- Determine and recommend a set of environmental conditions and appropriate actions to mitigate any adverse effects on the physical, biological and human environment that will ensure that the study area is developed and operated in an environmentally sound manner.

1.4 THE PROCESS

The proposed activity to be undertaken (together with the infrastructure to be provided) is listed as activity 15 of Government Notice R545, activity 11(iii) and 22(i) of Government Notice R544 dated 18 June 2010 which reads as follows:

R545, activity 15: **Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 ha or more.**

R544, Activity 11(i): The construction of a bridge where such construction occurs within a watercourse or within 32m of a watercourse measured from the edge of the water course excluding where such construction will behind the development setback line.

R544, Activity 22(i): the construction of a road, outside urban areas, with a reserve wider than 13.5 meters.

1.4.1 Scoping and Plan of Study for EIR

During the scoping phase, site inspection undertaken by both Consultants and applicant was sort of reconnaissance field survey where different components of the environment that are likely to be affected by the proposed development were identified. Interested and affected parties were identified and the proposed project was also advertised in the Highveld Tribune newspaper. DIGES held a public meeting in the project area during the scoping phase to provide project information including potential impacts to the public and allow them to identify issues and concerns.

The draft scoping report was made available to the identified stakeholders, government departments, local municipality and district municipality. The scoping report and Plan of Study submitted to Department of Economic Development Environment and Tourism (DEDET) on the

15th of July 2011 was approved on the 17th of October 2011. Reference is made to DEDET acceptance letter attached in **Appendix B.**

1.4.2 Specialist Studies

This document includes the specialist impact assessment reports commissioned as part of the environmental process to investigate and assess the area for the proposed development and the activities proposed and their associated impacts as well as provide additional information required by I & APs to inform their comment and the decision-making process. Engineering Services, Heritage and Geotechnical are attached as **Appendix H, I** and **J** respectively.

1.4.3 Impact Assessment

An impact assessment has been carried out and has been guided by the following criteria:

- **Assessment Criteria for Impacts**: As a means of determining the significance of the various impacts that can or may be associated with the establishment of a township, a series of assessment criteria was used for each impact. These criteria included an examination of the nature, extent, duration, intensity and probability of the impact occurring, and assessing whether the impact will be positive or negative for the biophysical and social environments at and surrounding the site.
- **Identification of Mitigation Measures:** The mitigatory measures recommended described possible actions for the reduction of the significant negative environmental impacts identified in the assessment. The philosophy of identifying mitigation measures for negative impacts was based on the reduction of the impact at source, the management of the impact through monitoring and control, and the involvement of the I&APs in consideration of mitigating measures, where appropriate.
- **Maximization of Positive Impacts:** The philosophy followed focused on maximizing the benefits to the local environment
- **Specialists Integration**: DIGES collated information from all specialists and summarized it in this report.
- **Environmental Management Programme:** Based on the information collected during the EIA, a project specific Environmental Management Programme (EMPr) was developed. The programme provides guidelines for the planning, design, construction, operation, maintenance of the proposed development, as well as a holistic management and monitoring plan for the entire project. Recommendations were given with regards to the responsible parties for the implementation of the EMPr.

1.5 ASSUMPTIONS AND LIMITATIONS

The following assumptions have been made during this study:

- ❖ It is assumed that the information in this report including specialists' reports is correct and factual.
- ❖ It is assumed that the public participation carried out is adequate and has identified all the interested and affected parties.
- ❖ It is also assumed that the Applicant has provided adequate details with regards to the processes to be followed during the construction and operation phase.
- ❖ It is assumed that the mitigation measures stated in the draft Environmental Management Programme if implemented would result in minimal negative impacts and maximum environmental benefits.

The following were the assumptions and limitations indicated by the specialists:

Engineering Services

- The Guideline for Human Settlement Planning and Design Volume ll (2000) is used as the basis for the design demand analysis of the services.

Heritage

- The developer is reminded that archaeological material (e.g. pottery, remains of stone walling, graves, etc) and fossils are often located underground, archaeological material might be hidden underground, as such the client is reminded to take precautions during construction of the proposed project, should any archaic material be unearthed, construction should be halted immediately and LIHRA be notified.

Geotechnical

- The ground conditions that are described in this report refer to those specifically encountered in the profiled test pits and exposed profiles. It is therefore possible that conditions at variance with those in the report may be encountered on other parts of the project area.

SECTION 2: PROJECT DESCRIPTION

2.1 PROPOSED ACTIVITY

DIGES was appointed by Mahlori Development Consultants on behalf of Bongiveli CC to lodge an application for environmental authorization of the establishment of a township at Ermelo within Msukaligwa Local Municipality.

The proposed project entails the construction of internal streets and the establishment of the following:

	Number of sites	
	Phase 1	***Phase 2***
residential erven	1284	4408
business stands	8	8
institutional erven	4	4
medical centre	-	1
taxi rank	-	1
Community facilities: Clinic	-	1
Crèche	-	3
Hall	-	1
Churches	1	2
Primary schools	1	1
Secondary schools	1	1
Administration facility		1
Public space	6	14
Private open space	3	5
Sports field		1
Mixed use	3	2
Cemetery	1	-
Gatehouse and access	1	4
TOTAL	**1313**	**4458**

In addition to the establishment of the erven, services such as bulk water supply, electricity, storm water drainage, sanitation and waste management services will also be provided.

2.2 LOCATION

The proposed development will be located on Portion 6 of Farm Rietspruit 437 IS in Ermelo, It is situated approximately 3km south of Ermelo City Centre and can be accessed via N11 road. The area is located to the west of N11 road. The global positioning co-ordinates are: **26˚ 34' 05.86"**S and **29˚ 58' 03.38"E**

SECTION 3: THE AFFECTED ENVIRONMENT

Site information used during the environmental assessment process was compiled by the following specialists:

Table 3-1: Project Specialist Team

Consultant	Specialist Field
Dambuwo Consulting Engineers	Engineering Services
Vhubvo	Heritage
DIGES	Geotechnical

3.1 CLIMATE

The average annual rainfall for this region is approximately 735.4mm as measured in Bethal Municipality (Midgley *et al*, 1994). The rainy season is between November and March. The average daily maximum temperature is 24.1°c and the average daily minimum temperature is 15.8°c.

3.2 SOILS

The area is characterized by deep, red to yellow, sandy soils.A geotechnical study was undertaken at the proposed area to assess the suitability of the soil for the proposed development. A detailed geotechnical report is attached in **Appendix J**.

3.3 DRAINAGE

The study area is located in the Upper Vaal Catchment Management Area. The proposed site is divided into two portions by a non perennial river. The area is drained by means of surface run off, with storm water collecting towards the southern side.

3.4 GEOLOGICAL CONDITIONS

3.4.1 Lithostratigraphy

According to the geological information available, the proposed area of development is underlain by shales and sandstones of the Vryheid and Volksrust Formations (Ecca Group,

Karoo Sequence) predominate the underlying rock types, giving rise to deep, red to yellow, sandy soils. A detailed geotechnical report is attached in **Appendix J.**

4.4.2 Small Scale Mining

On the south-east of the site, there is an un-rehabilitated pit. There is evidence that gravel material was excavated from there.

3.5 TOPOGRAPHY

The study area is located on a flat to gentle slope. The slope of the area is draped towards the north east and southern direction. No prominent regional topographical features occur within the boundaries of the proposed area.

3.6 FLORA & FAUNA

According to Acocks 1996, the proposed area falls within grassland biome, the vegetation type is classified as North Eastern Sandy Highveld. Grass species identified include spear grass (Heteropogon contortus). No fauna was observed on site

3.7 LAND USE

The proposed site has been utilized for farming in the past. It is currently characterised by two houses and grassland. Other surrounding land use includes school, residential houses and water purification structures with two reservoirs

3.8 ARCHAEOLOGICAL ATTRIBUTES

According to the National Heritage Resources Act, 1999 (Act no.2 of 1999) objects that may be affected include the burial sites, buildings of more than 60 years of age, special geological features (fossil prints and bushman rock art) and paleontological objects. Graves were identified at the proposed site during the survey. A detailed heritage survey is attached in **Appendix M.**

3.9 VISUAL

Currently the area is characterised of grasses and two houses. A power line also transverses across the site.

3.10 INFRASTRUCTURE AND SERVICES

- **Roads**

Exiting roads, N11 and R39 are located near the proposed site

- **Water**

There is a non perennial river crossing the proposed area.

- **Electricity**

High tension electricity transmission power line infrastructure occurs within the study area

- **Toilet facilities**

The majority of the population within the municipality has access to flush toilets.

3.11 SOCIO-ECONOMIC ENVIRONMENT

The municipality is predominantly rural in nature with key anchor towns that dominate the urban settlements. Based on Global Insight Southern Africa Regional Explore, 2001 to 2009 estimates, the population of Msukaligwa Local Municipality grew from 129086 to 152443 persons. Therefore the population increased with 23357 persons implying an annual growth rate of 2.0% over a period of 9 years. Taking into consideration the estimated average annual growth rate, it therefore expected that the population could reach 166688 persons by 2015 based on the previous six years average growth of 1.5%.

When comparing the period 2001 to 2009, employment rate stands at 40.7% with an increase of 1.7% between 2001 and 2009. Unemployment is showing a decrease of 1.8% while economically active persons stay the same. There is still a lot be done in dealing with the unemployment challenge which the Municipality, District, business/private sector and government sectors should collectively come up with strategies to deal with this problem. Though 6239 jobs were created between 2001 and 2009, there had been no significant impact on unemployment as more people entered the job market due to population growth and job losses from some sectors of economy. Msukaligwa Local Municipality has 34.4% economically active population with 29% of its population employed though the unemployment is at 21.1%. The population that is subjected to poverty is 45.5 %.**(Gert Sibande District IDP 2011)**

The relatively low income levels are indicative of poverty and a high reliance on social assistance, specifically housing subsidies.

SECTION 4: ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

The following legislation guided this assessment process:

4.1 THE CONSTITUTION OF SOUTH AFRICA

The constitution guarantees basic human rights and provides guiding principles for society. The environmental rights in the constitution states:

"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;
   (iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

4.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

In addition to the Constitution, there is a special environmental legislation in South Africa: the National Environmental Management Act (NEMA). The National Environmental Management Act aims to improve the quality of environmental decision-making by setting out principles for environmental management that apply to all government departments and organisations that may affect the environment. NEMA also creates a framework for facilitating the role of civil society in environmental governance (see below).

The Principles of National Environmental Management - (DEAT 1998)

- Environmental management must place people and their needs at the forefront of its concern.
- Development must be socially, environmentally and economically sustainable.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.
- Environmental justice must be pursued.

- Equitable access to environmental resources to meet basic human needs and ensure human well being must be pursued.
- Responsibility for the environmental health and safety consequences of a project or activity must exist throughout its life cycle.
- The participation of all interested and affected parties in environmental governance must be promoted.
- Decisions must take into account the interests; needs and values of all interested and affected parties.
- The social, economic and environmental impacts of activities, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.
- The environment is held in public trust for the people, the beneficial use of which environmental resources must serve the public interest and the environment must be protected as the people's common heritage.
- The costs of remedying pollution, environmental degradation and consequent adverse health effects must be paid for by those responsible for harming the environment.
- Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

4.3 THE PRINCIPLES OF INTEGRATED ENVIRONMENTAL MANAGEMENT

The principles of Integrated Environmental Management (IEM), first published in 1992, aim to guide the integration of environmental management into decision-making throughout the life cycle of the project (DEAT 1992). The IEM principles also aim to ensure that environmental impacts are considered before actions are taken or implemented and to ensure that there are adequate opportunities for public participation in decisions that may affect the environment (See below).

The Principles of Integrated Environmental Management **-** (DEAT 1992)

- Informed decision-making.
- Accountability for information on which decisions are taken.

- Accountability for decisions taken.
- A broad meaning given to the term environment that includes physical, biological, social, economic, cultural, historical and political components.
- An open, participatory approach in planning of proposals

4.4 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT NO, 10 OF 2004

This Act controls the management and conservation of South African biodiversity within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically makes provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

4.5 NATIONAL WATER ACT

National Water Act 1998 (Act 36 of 1998) & Water Services Act 1997 (Act 108 of 1997): The purpose of this Act is to "ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled". The Water Act takes into account the meeting of basic human needs of present and future generations, equitable access to water, redressing the results of past discrimination, efficient, sustainable and beneficial use of water in the public interest, and other factors. The Act is administered by DWA.

4.6 THE NATIONAL HERITAGE RESOURCES ACT (ACT NO. 25 OF 1999)

4.6.1 Structures (Section 34 (1))

No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the South African Heritage Resources Agency (SAHRA), or the responsible provincial resources authority.

4.6.2 Archaeology (Section 35 (4))

No person may, without a permit issued by the SAHRA or the responsible heritage resources authority, destroy or damage, excavate, alter or remove from its original position, or collect, any archaeological material or object.

4.6.3 Burial Grounds and Graves (Section 36 (3))

No person may, without a permit issued by SAHRA or a provincial heritage authority:

- Destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

4.6.4 Application Requirements and Procedure

Permit applications must be made on the official form:

- Application to destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of a Provincial Heritage Site or demolish a structure 60 years old or more, as protected in terms of the National Heritage Resources Act (Act No. 25 of 1999)
- Application for permit to destroy: Archaeological and paleontological sites and meteorites.
- Application for permit: Burial Grounds and Graves.
- The Proponent must submit permit applications to SAHRA or the relevant provincial heritage resources authority.

4.7 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT 43 OF 1983)

The Conservation of Agricultural Resources Act ([CARA] Act 43, 1983) provides for the:

- Protection of wetlands; and
- Requires the removal of listed alien invasive species.

The National Department of Agriculture is the responsible authority for enforcing the CARA. This Act also requires that any declared invader species on Eskom land must be controlled according to their declared invader status.

4.8 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (ACT 59 OF 2008)

The National Environmental Management: Waste Act, 2008 (Act No. 58 of 2008), came into operation on the 1st of July 2009. The Waste Act repealed Section 20 of the Environment Conservation Act, 1989 (Act No. 73 of 1989) (ECA) and introduced new provisions regarding the licensing of waste management activities. In terms of the Waste Act no person may commence, undertake or conduct a waste management activity except in accordance with:

- The requirements or standards determined in terms of the Waste Act for that activity; and

- A waste management license issued in respect of that activity, if a license is required.

A list of waste management activities was published on the 3rd of July 2009. This list of activities identifies activities that may not be commenced, undertaken or conducted by any person unless a waste management licence is issued in respect of that activity.

4.9 MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT 2002

In the case that additional material is needed and the only source for this material are borrow pits that fall outside the construction site, The submission of an Environmental Management Programme Report (EMPR) to the Department of Minerals and Energy to obtain a licence would be a legal requirement.

4.10 OCCUPATIONAL HEALTH AND SAFETY ACT 85 OF 1993

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

4.11 REGULATIONS AND GUIDELINES

The following regulations and guidelines were also used:

i. Environmental Impact Assessment Regulations Government Notice no. 543;
ii. Government Notice no. 545;
iii. Information Series 5: Impact Significance;
iv. Information Series 7: Cumulative Effects Assessment; and
v. Information Series 11: Criteria for determining Alternatives in EIA.

SECTION 5: PUBLIC PARTICIPATION PROCESS

5.1 INTRODUCTION

Public participation process was done according to regulation 54 of the Government Notice R.543 in terms of the Environmental Impact assessment Regulation, June 2010 that set out the need and the processes that need to be followed when doing public participation. The public participation process is viewed as process of empowering communities in their efforts to safeguard the resource-base in more efficient ways and to use the resources sustainably. It would also enable people to play lead roles in identifying, designing, directing and implementing any development activity which has an impact on their immediate environment, and therefore on their way of life.

The general public includes business, industry, academics, and people at the grass root level – may have additional non-indigenous knowledge and information which may help the sustainability of an activity. The public participation process (PPP) forms a key component of Environmental Impact Assessment and has resulted in the identification of a number of issues. The approach and objectives of the PPP are outlined below, followed by a summary of the issues raised during the Scoping Study.

5.2 OBJECTIVES AND APPROACH TO THE PPP

The objectives of the PPP were to;

- Identify stakeholders and inform them about the proposed project;
- Provide stakeholders with the opportunity to identify key issues and concerns associated with the proposed project; and
- Identify mitigation and management options to address potential environmental impacts.

5.3 PUBLIC PARTICIPATION PROCESS

As part of the development process DIGES consulted with the stakeholders by giving them the opportunity to consider the project in detail and addressing their concerns during the entire project duration. During Scoping and Environmental Impact process the following activities were undertaken to ensure that the Interested and Affected Parties had adequate information with regards to the project.

5.3.1 Scoping Phase

As part of this process the following activities were undertaken to ensure that the Interested and Affected Parties had adequate information with regards to the project:

i. Interested and affected parties were identified;
ii. The proposed project was advertised in the Highveld Tribune, which was publicized on the 12th of April 2011, in order to notify the community members, interested & affected parties and neighboring communities of the proposed development;
iii. On-site advertisement notices of **A3 size** were placed on the fence of homesteads within the project area and public places such as shops at Ermelo
iv. The draft scoping report was made available to the following Interested and Affected parties from the 4th of July to the 14th of August 2011:
    - Department of Water Affairs
    - Department of Human Settlements;
    - Department of Agriculture, Rural development and Land Administration;
    - Gert Sibande District Municipality
    - Msukaligwa Local Municipality

5.3.2 Public Meetings

DIGES held one public meeting on the 13th of April 2011 in Ermelo to provide project information including potential impacts to the public and allow them to identify issues and concerns.

5.3.3 Environmental Impact Assessment Phase

As part of public participation the following activities were undertaken to ensure that the Interested and Affected Parties had adequate information with regards to the project:

The draft environmental impact assessment report was made available to the following Interested and Affected parties from the 17th of September to the 02nd of October 2012:

- Department of Water Affairs
- Department of Human Settlements;
- Department of Agriculture, Rural development and Land Administration;
- Gert Sibande District Municipality
- Msukaligwa Local Municipality

An advert was placed in the Highveld Tribune newspaper dated the 21st August 2012 informing the public about the locations where they can access the draft environmental impact report.

Table 5-2: Venue for EIR Public Review

Venue	**Location**
Msukaligwa Local Municipality	Ermelo
Ermelo Public Library	Ermelo
DIGES	Polokwane

SECTION 6: OVERVIEW OF SPECIALIST SURVEYS

6.1 ENGINEERING SERVICES

The engineering services study was carried out by DIGES cc and the full report is attached as **APPENDIX H.**

The terms of reference included:

i. Outlining the availability of bulk services for the proposed connector services that will be required.
ii. To comment on the serviceability of the proposed township layout in terms of internal water, sewer, storm water and roads in relation to the existing bulk services.

6.1.1 Methodology

Data was collected through Municipal offices from previous studies conducted in the area. A field visit and site inspection was also conducted. No services were found on site.

6.1.2 Results

- **Bulk Infrastructure-**

Water Supply

There is no water infrastructure at the proposed project area. The average domestic water demand is about 25 l/p/day with an average of 5.5 residents per stand for the adjacent areas. However when fully developed the demand is expected to be to about 100 l/p/d for the project area. The main water supply to the study area is to be supplied by Msukaligwa Local municipality .With the domestic water demand expected to be about 100 l/p/day with an average of 5.5 residents per stand, the consumption is estimated to be 3439.8 m3per day

- **Sewer**

When fully developed the Proposed Township Reitspruit development site would produce AADWF of about 2923.83 kl of sewage. A more sustainable solution would be to develop a formal sewerage disposal system to cater for the development site. It is recommended that a package plant with capacity of about 30505.43Kl must be developed. A top level assessment indicates that WSP system would not suit the environs of development site. Thus the sewage will need to be pumped to the Ermelo STP.

- **Electricity**

There are Eskom power lines traversing the study area. An application for electricity connections will have to be made to Eskom for the provision of services.

- **Roads**

Access roads to the new development will be along N11 road. The road will feed the traffic into the local access road. The local access roads and the internal roads will be tarred.

- **Storm Water**

Storm water could be channeled on the internal roads with the outlets at low points. No proper storm water management is yet in place in the study site and this pose a threat to continued soil erosion especially after heavy rainfall.

- **Telephone Lines**

There are no telephone lines on the development area, thus applications for individual connections will have to be made to Telkom.

6.1.3 Recommendations

The following recommendations were made by the specialist:

- **Water (bulk Infrastructure)**

i. All units with an AADD of 600l/d with a peak factor of 6
ii. The fire water required will be 20l/s with a total instantaneous demand of 35l/s for design proposes.
iii. The nearest bulk water services will be considered for the supply. This will be in the form of nearest water reservoirs or bulk supply pipelines.
iv. Businesses and institutions at 20% ADP Residential units
v. The ADD is estimated at 4127.76 m3per day. /day.

- **Sewer**

i. The minimum sewer pipe to be installed is estimated be a 160mm diameter pipe
ii. A 15 % infiltration allowance to be included
iii. Peak factor of 2.5
iv. The ADS is estimated at 2923.83 m3 /day
v. Businesses and institutions at 20% ADP Residential units

- **Roads**

i. Accesses to dwelling units should provide a smooth entry, whilst preventing storm water in the street; and

ii. Internal roads to be category UC streets (residential streets) and tarred.

6.2 GEOTECHNICAL INVESTIGATION

The geotechnical investigation was carried out by DIGES and the full report is attached as **APPENDIX J.**

The terms of reference included the determination of the following aspects:

- to delineate the site into the prescribed geotechnical zones according to the different founding conditions
- to provide suitable foundation recommendations for the proposed development
- to determine the mechanical properties of the soil underlying the area
- to determine and evaluate the regional geological character of the study area
- to determine regional soil suitability covering the site
- to recommend necessary precautionary measures during design and construction.

6.2.1 Methodology

The fieldwork, entailing a site walkover, trial pitting and profile descriptions, was conducted on the 28th of July 2011. Seven test pits were excavated using picks and shovels. The test pits were positioned to cover the entire site. An engineering geologist inspected the test pits and recorded the soil profiles using the standard procedures as recommended by (SAIEG 1997).

Disturbed soil samples were retrieved from selected layers and submitted to Morwamocha Laboratory Services for testing purposes. Standard indicator tests, Atterberg limits, California Bearing Ratio tests were conducted on the soil samples that were submitted to Morwamocha Laboratory Services.

6.2.2 Results

The fieldwork, entailing a site walkover, trial pitting and profile descriptions, was conducted on 28 July 2011. Twelve test pits were excavated using picks and shovels. The test pits were positioned to zone the site, giving a general overview of the underlying soil material. An engineering geologist inspected the test pits and recorded the soil profiles using the standard procedures as recommended by (SAIEG 1997).

Disturbed soil samples were retrieved from selected layers and submitted to Morwamocha Laboratory Services for testing purposes. Foundation indicators were performed on these samples to determine the particle size distribution and plasticity of the soil. The purposes and therefore the grading were carried out to 0.002mm.

6.3.3 Recommendations

Zoning of the site revealed three zones, with intermediate constraints regarding the settlement or consolidation potential of the soil. The classification and foundation recommendations are based on results from this investigation.

Site Designation C/S, C1/S1, H1/H2/C2

Class C/S

Sporadic zones across this site where rock outcrops has been encountered at surface or at shallow depth (approximately less than 500mm) has been classified as Class R. And it is recommended that ***Conventional strip footings or Slab-on-ground foundations*** should be considered for such classified area, though installation of services might be a problem where bedrock is found within the services installation depth.

Class C1/S1

This will include zones where thick horizons of sands were encountered (around test pits 1 and 2). It is recommended that ***engineered concrete raft*** designed to withstand approximately 15mm of differential settlement should be used as a founding solution.

Class H1/H2/C2

Taking all factors into consideration it is our recommendation that one foundation solution be designed for this zone. The solution involves the construction of ***cellular raft foundations with variable beam depths and mass reinforcement*** be used with light reinforcement in the masonry. It is further recommended that all inner walls be constructed with butt joints; with the outer walls tied together with concertina ties to form articulation joints that will allow some differential movement without causing serious damage to the masonry brickwork. The cellular rafts are designed to withstand the expected differential movement that can be expected as a result of settlement of the in situ material due to the loads imposed by the construction of the houses.

6.3 HERITAGE

The heritage impact study was carried out by Vhubvo Archaeo-Heritage Consultants and the full report is attached as **APPENDIX I.**

The terms of reference included:

i. To establish whether any of the types and ranges of heritage resources do occur within the perimeters of the Project Area and, if so, to determine the level of significance of these heritage resources; and

ii. To make recommendations regarding the mitigation or the conservation of any significant heritage resources that may be affected by the proposed Project.

6.3.1 Methodology

The literature survey was augmented by the field survey which targeted the identification of sensitive spots within the project area. Literature consulted includes maps and archaeological databases.

6.3.2 Results

- **Archaeology**

Archaeological materials are often, if not always, located underground. However, damage to the surface as a result of development (e.g. structures, roads, etc) impacts badly to archaeological material. Although, no archaeological material was observed on the surface, it should not be interpreted as absenteeism. Thus, the possibility of finding archaeological material is high, considering that before modern farming was initiated there were people who resided in the region. Bearing in mind that this development is expected to go beyond 1m deep; an extent that modern farming didn't reach. Possibility of accidentally-disturbing an archaeological site is considered high.

It's in that note that we recommend that an archaeologist, capable of recognizing archaeological material, be made available on the initial stages of construction. Report of any finds can result in positive impact, in that knowledge will contributed towards the reconstruction of our past.

- **Paleontology**

The impact on paleontology is very low. Paleontological materials are known to preserve well in ancient dunes. There was no indication, or signs of dunes on the site.

- **Human graves**

Unlike palaeontology, human graves are not always determined by the nature of the environment. They can occur at any place. Either be a lost grave yards, prehistoric burials or illegal burials or recent graves. Thus, any of the mentioned is protected by legislation. Depending on the context of the graves, they are either protected by the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999), which protect grave that are older than 60 years of age. Or the Human Tissues Act (Act No 65 of 1983) which protect graves that are younger than 60 years of age. 78 graves were identified on different section of the proposed area. These graves range from the early 1900s to much recent. While some of them have tomb-stones, others are indicative by cairns of stones. Vandalising (or tampering) has also been identified on some of the graves.

- **Structures**

Several structures were observed on the area proposed for development. None of these are protected by the legislature.

- **Oral tradition**

Heritage Impact Assessment is not limited to archaeological and paleontological material, human graves and historical building; it also includes intangible resources such as places of historical/ cultural significant, oral tradition and rituals. However, given the extent of disturbance by recent farming, no cultural-traditional impacts are expected on the site.

- **Other Material**

Terracing has been observed thought the site. Also, several cement-poles and iron-rod are scattered around the study area.

6.3.3 Recommendations

The specialist recommended the following mitigation measures:

- it is advised that the graves be preserved, and a management plan be set in place to ensure their conservation and accessibility by the family concerned
- The applicant is reminded to take precautions during construction of the proposed project, should any archaic material be unearthed, construction should be halted immediately and SAHRA be notified.

SECTION 7: ALTERNATIVES

This chapter identifies and describes the alternative facilities, infrastructure options and motivation for site and site selection for the proposed projects. In terms of the NEMA EIA Regulations, one of the criteria to be taken into account by the competent authority when considering an application is "*any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment*". Alternatives are defined in the Regulations as "*different means of meeting the general purpose and requirements of the activity*". It is therefore necessary to provide a description of the need and desirability of the proposed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity.

The "*feasibility*" and "*reasonability*" of an alternative will therefore be measured against the general purpose, requirements and need of the activity and how it impacts on the environment and on the community that may be affected by the activity. It is therefore vital that the identification, investigation and assessment of alternatives address the issues/impacts of a proposed development. The proposed activity has three route alignments

7.1 ALTERNATIVES

i. Location Alternatives

According to Msukaligwa Municipality IDP 2010/1011, the proposed area has been earmarked for residential development. The municipality has planned to use the land south of Ermelo town, west of the N11 road for housing development, location alternatives were therefore not considered.

ii. Activity Alternatives

Activity alternatives were also not considered due to the fact that the proposed project will provide adequate and well serviced houses to the residents.

iii. Demand Alternatives

Demand alternatives were not considered as the proposed project intends to address the need for housing by the residents within the town and surrounding area.

iv. Scheduling Alternatives

Scheduling alternatives will be discussed in the Environmental Management Programme, when the extent and severity of the expected impacts are addressed.

v. Site Layout Alternatives

Layout alternatives were not considered

7.2 NO-GO ACTION ALTERNATIVES

The Department of Environmental Affairs stresses the consideration of the "no development/no-go action" option in cases where a proposed development is envisaged to have significant negative environmental impacts, or where such impacts cannot be militated against effectively or satisfactorily.

The IEM procedure suggests that the "no action" option should be considered as an alternative. This option is normally considered during an EIA where significant negative environmental impacts are expected or if the proposed site is considered to be ecologically sensitive or unique. In the event that the project does not commence, it will result in uncontrolled and unmitigated encroachments resulting in a **HIGH** impact on stream. The following considerations also enhance its need and desirability:

- The impacts that were identified by the heritage and geotechnical studies can be mitigated;
- There was no opposition of the project during public participation.

7.3 ADVANTAGES AND DISADVANTAGES

Advantages of the proposed development include:

- The development will promote the availability of residential and employment opportunities during construction.
- It will contribute to the eradication of illegal settlement in the municipality.

Disadvantages of the proposed development include:

- The development will cause significant negative impacts on the environment if no mitigation measures are put in place.
- It will result in loss of potential land for grazing and agricultural activities.

SECTION 8: POTENTIAL IMPACTS AND DETERMINATION OF SIGNIFICANCE

This section of the report evaluates the possible negative impacts, which may occur as a result of going ahead with the proposed project. Potentially environmental impacts have been identified based on the following:

- A review of the proposed activity;
- The nature of the receiving environment;

Risks and key issues were identified during the scoping and environmental assessment and through an internal process based on similar developments and site visits. These included the following:

- Biodiversity impacts
- Hydrological impacts
- Soil Impacts
- Atmospheric impact
- Visual and noise pollution
- Heritage and archeological materials

8.1 DETERMINATION OF THE SIGNIFICANCE OF IMPACTS

According to Thompson (1988 &1990) in DEAT 2000, the significance of an impact is an expression of the cost or value of an impact to society. Parameters such as intensity of impacts, duration, extent, significance and probability of occurrence are used in assessing the identified environmental impacts. Impacts are divided according to phases, construction and operation phase, assessed and mitigation measures proposed. The table below indicates the method that is be used to evaluate impacts

Table 8-1: Assessment Methodology of Identified Issues

Status	Whether the impact is positive/negative/neutral
Intensity of impact	Whether the impact is destructive or harmless.
Low	Minimal impacts on the biophysical and socio-economic environment.
Medium	MEDIUM impacts on the biophysical and socio-economic environment.
High	Significant impact on the biophysical and socio-economic environment
Duration of impacts	Time it takes a resource to recover from project impacts.
Short term	Impacts last for a period of 1 to 5 years
Medium Term	Impacts last for a period 5 to 10 years
Long Term	Impacts last beyond 10 years
Extent of impacts	Refers to the geographic area the impacts will be limited to.
Site	Impacts limited to site
Local	Impacts limited to 3-7 km of the site
Regional	Impacts on a regional scale
Significance of impacts after mitigation measures in place	
Very low	Very insignificant impacts on the environment
Low	Low, minimal impacts on the environment
Medium	MEDIUM impacts (can be mitigated) on the environment
Significance of impacts before measures in place	**If the impact will need to be significantly accommodated in the project design.**
Medium	MEDIUM impacts on the environment
High	High impacts on the environment

Definite	Irreversible impacts
Probability of impacts	**The probability that a certain impact will in fact realize;**
Low	Less than 30% chances of occurrence
Medium	Between 30% and 60% chance of occurrence
High	Above 60 % chance of occurrence
Definite	Definitely occurrence of impacts in spite of mitigation
Cumulative	impacts that result from the incremental impact of the proposed activity on a common resource
Marginal	Insignificant
Compounding	Increased impact
Reversibility	Length of time for expected recovery or extent of expected recovery.

8.2 IMPACT RATINGS

8.2.1 Issue: Impact on Fauna, Flora and Red Data Species

i) Description

With regards to flora, there are no known red data species or significant indigenous vegetation on-site or within the project area. The site is currently characterised by grass.

Direct Impacts

Construction Phase

- Habitat destruction due to the removal and damage of vegetation through soil stripping.
- Vegetation may be impacted through removal and site disturbances due to the construction activities, leading to shifts in vegetation community and habitat unit structures,
- The movement of heavy machinery will result in soil compaction that will modify habitats, destroy vegetation and inhibit re-vegetation.
- Pollution of soils due to oil/fuel leaks and wastes that will affect floral species.
- Erosion of stockpiled topsoil and the disturbance of soils due to vegetation stripping will lead to habitat inundation.

- Vegetation removal and associated habitat destruction would lead to habitat loss for avifauna;
- The destruction of avifaunal nests when vegetation is being cleared;
- Disturbances through construction activities that will displace various avifaunal species.

Operation

Table 8-2: Avifauna Impact_Habitat Transformation

Habitat Transformation	
Description	Vegetation Clearance
Status	Negative
Extent	Site
Duration	Long Term
Intensity	Medium
Probability	Medium
Cumulative	Marginal
Significance before mitigation measures	Low
Significant after mitigation measures	Low

Table 8-3: Vegetation Clearance

Removal of Natural vegetation	
Description	Removal of vegetation during Construction
Status	Negative
Extent	Site
Duration	Short Term
Intensity	Low/MEDIUM
Probability	High
Cumulative	Marginal
Significance before mitigation measures	Low-Medium
Significance after mitigation measures	Low

Table 8-4: Introduction of Alien Vegetation

Introduction and Proliferation of alien vegetation	
Description	The introduction of alien vegetation during construction and operation
Status	Negative
Extent	Site and Local
Duration	Long term
intensity	Low/ MEDIUM
Probability	high
Cumulative	Marginal- Compounding
Significance before mitigation measures	Low-Medium
Significance after mitigation measures	low

ii) Mitigations

- Need to ensure all alien plants on construction sites are removed.
- Alien vegetation must be cleared on a regular basis.

8.2.2 Issue: Impacts on hydrology

i) Description

Pre-Construction and Construction Impacts:

- Water may be illegally abstracted from water bodies for construction activities such as dust suppression;
- Servitude clearing would increase surface water runoff;
- Soil erosion from servitude clearing would increase sedimentation in the river;
- Landscaping may have an indirect impact on the existing drainage lines and dry water courses by causing increased run off, erosion and limited seepage.
- Formation of new drainage lines may also take place due to obstructions to water flow.

Operation

During routine maintenance, water may be impacted by the following:

- Herbicide runoff from servitude clearing (including spraying for alien weeds) lead to water quality deterioration;

- Servitude clearing would increase surface water runoff and sedimentation in local water bodies;
- Fuel leaks from maintenance vehicles or spills of materials such as oil during maintenance would result in a deterioration of water quality;
- Waste or maintenance material may be dumped in local water bodies.

Table 8-5: Water Resources

Impact on Water Resources (Construction Phase)	
Description	Water pollution caused by oil and fuel spills, ablution facilities
Status	Negative
Extent	Isolated Sites
Duration	Long term
Intensity	MEDIUM-high
Probability	High
Cumulative	Marginal-compounding
Significance before mitigation measures	High
Significance after mitigation measures	Low

Impact on Water Resources (Operation)	
Description	Waste polluting the river
Status	Negative
Extent	Isolated Sites
Duration	Long term
Intensity	MEDIUM-high
Probability	High
Cumulative	Marginal-compounding
Significance before mitigation measures	High
Significance after mitigation measures	Low

ii) Mitigation

- The cleaning and storing of project equipment is not permitted near water sources. It must be done in a bund walled area to contain the spillages.
- In the event that water would be used during the construction phase, a water use licence should be applied for at the Department of Water Affairs.
- Hazardous materials must be handled in the bunded area to contain possible spills on the ground.
- Chemical toilets must be provided for the construction workers and must be regularly serviced to avoid spills or leaks from toilets to groundwater.
- No construction vehicles or activities must be allowed to work within 100m from the river
- No mixing of concrete to occur within 100m of water course;
- Care must be taken to ensure that in removing vegetation adequate erosion control measures are implemented.

Operation

- A waste collection system should be established; and
- All sewerage to be transported within the municipal sewer systems.

8.2.3 Issue: Impact on soil

i) Description

Pre construction Impacts

- Vegetation clearing on site will leave soil bare and susceptible to erosion.

Construction Impacts

- Vegetation cover within the areas where the construction materials are laid down will be damaged, which could leave soil bare and susceptible to erosion.
- Oil or fuel leakages from construction equipment will contaminate soils.
- The movement of heavy machinery will result in soil compaction that will modify habitats, destroy vegetation and inhibit re-vegetation.
- Erosion of stockpiled topsoil and the disturbance of soils due to vegetation stripping will lead to habitat inundation.

Operation

- Oil or fuel leakages from maintenance vehicles will contaminate soils.

Table 8-6: Soil

Soil Erosion	
Description	Vegetation clearance will cause soil erosion
Status	Negative
Extent	Site/Local
Duration	Short
Intensity	High
Probability	High
Cumulative	Compounding
Significant before mitigation measures	Low-Medium
Significant after mitigation measures	Low

ii) Mitigations

- The design and layout of the project will occur in sympathy with site-specific soil conditions and topography.
- All construction activities will be managed and controlled according to the EMPr.
- Areas around the stream are more sensitive and therefore will be avoided.
- Ensure that minimal traffic uses the construction routes and if possible construction must be limited to drier periods
- After construction, all construction sites must be rehabilitated.
- Construction will be within the restrictions imposed by geomorphology associated with the area, reducing environmental impact on soil.
- Topsoil must be removed from all areas where physical disturbance of the surface would occur and must be stored and adequately protected for later re-use.
- Soils should not be stripped when they are wet. This can lead to compaction and loss of soil structure.
- The opportunistic rehabilitation of disturbed areas must accompany any construction work in the area.
- Where required, cut-off trenches can be installed to divert substantial run-off and prevent erosion.
- The stabilization of disturbed areas, roads and/or steep cuttings is very site specific, and should be determined accordingly.

- During construction, areas susceptible to erosion must be protected by installing temporary or permanent drainage works and energy dispersion mechanisms.
- The management and recycling of solid and liquid waste, as well as hazardous waste, to prevent soil contamination, is outlined in the Environmental Management Programme.

8.2.4 Issue: Atmospheric Pollution

i) Description

Construction activities would temporary increase particulates concentration in and around the project sites. The most significant expected impact relating to air quality is that of fugitive dust during construction phase and related vegetation clearing. Activities such as excavations of the trenches/ pits, ripping and the use of roads by construction vehicles will cause dust. Dust covers roadside vegetation and can affect the growth of these plants as well as having a potential impact on the animals that utilise the vegetation. Dust also has a visual impact if seen from a distance. Due to all these activities dust can remain problematic. The nuisance and aesthetic impacts associated with the dust generated during construction should be minimal due to the temporary nature of this occurrence.

Table 8-7: Atmospheric Pollution

Atmospheric Pollution	
Description	Emission of dust due to construction activities
Status	Negative
Extent	Site/Local
Duration	Short
Intensity	Medium
Probability	High
Cumulative	Marginal
Significant before mitigation measures	Low
Significant after mitigation measures	Low

ii) Mitigations-

- The nuisance and aesthetic impacts associated with dust generated during construction will be minimal due to the temporary nature of this occurrence.
- Occasional spraying of roads with water suppresses dust during construction.

8.2.5 Issue: Visual Impact

The proposed area is adjacent to a residential area and approximately 4km from the town centre hence the impacts to the landscape will be limited in extent. The housing project will also be constructed to blend with the natural environment.

Table 8-8: Visual_Landscape

Landscape Impacts (Construction & Operation)	
Description	Alterations to the visual character/value of the landscape
Status	Neutral
Extent	Local
Duration	High
Intensity	Low
Probability	Definite
Cumulative	Marginal
Significant before mitigation measures	Low
Significant after mitigation measures	Low

Mitigations-

- Eco-friendly colours may be used to reduce the visual impact of structures to be built.
- Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation;
- Avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover;
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and
- Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height.

8.2.6 Issue: Noise Impact

i. Description

Heavy machinery is often required for construction works. This machinery contributes to tremendous amount of sustained noise. Such noise elevations affect the environment by:

- Sonically vibrating structures
- Presenting a danger to human welfare

Even when it is not perceived consciously, the noise elevations can affect human welfare in varying degrees, both physiologically and psychologically. It becomes a source of annoyance, creating communication problems and leading to elevated stress levels as well as associated behavioral and health effects.

Table 8-9: Noise

	Impact on noise
Description	Noise from construction activities and vehicles
Status	Neutral
Extent	Local
Duration	Short
Intensity	low
Probability	Definite
Cumulative	Marginal
Significant before mitigation measures	Medium
Significant after mitigation measures	Low

ii. Mitigation

- Construction must be limited to normal working hours.
- All machinery, including earthmoving vehicles needs regular maintenance to reduce noise intensity.
- Installation of sound vibration detectors on plant machinery is recommended.
- Construction vehicles must use designated entry and exit routes so that noise impacts can be largely confined to specific access routes.
- All construction activities must abide to national noise laws.

- The contractor should ensure that construction workers use ear plugs.

8.2.7 Issue: Archaeological Impact

i) Description

Development may damage graves and buried archaeological important artefacts.

Table 8-10: Heritage

Archaeological Impact	
Description	Damage to graves
Status	Negative
Extent	Site
Duration	Short
Intensity	Low
Probability	Medium
Significant before mitigation measures	High
Significant after mitigation measures	Low

ii) Mitigations

- Discovered archaeological attributes during construction must be reported to South African Heritage Resources Agency.

8.2.8 Issue: Solid Waste Management

i) Description

Any construction work generates solid waste, which can spread through the environment.

Table 8-11: Waste Management

Impact on Solid Waste	
Description	Production of waste during construction and operation
Status	Negative
Extent	Site
Duration	Short (construction) Long Term (operation)
Intensity	Medium
Probability	Definite
Cumulative	Marginal- Compounding
Significant before mitigation measures	Definite
Significant after mitigation measures	Low

ii) Mitigations

- All waste produced by construction work must be disposed of at the appropriate designated disposal site. The contractor has to ensure that the waste is disposed of in a registered landfill site.
- No illegal dumping of waste must be allowed; all waste must be collected on a weekly basis.
- Waste disposal bins or skips to be provided throughout the site at predetermined locations during construction phase.
- No burying or burning of waste will be allowed on site.
- General waste to be transported in an appropriate manner to external waste sites.
- The recycling of solid waste by the sorting of plastic, glass and metal to be promoted and waste should be removed regularly.
- All waste produced by construction of access roads and other public amenities must disposed of at the relevant disposal site.
- No illegal dumping of waste must be allowed; all waste must be collected on a weekly basis during operation phase and be disposed at the permitted disposal facility.
- Chemical toilets must be use for construction workers be disposed at the relevant facility.

Operation

- Waste to be collected regularly by municipality and deposited at permitted landfill site;

8.2.9 Issue: Land Use

i. Description

Negative impacts are expected since the area was previously being used for grazing. Positive impact will however be recognised due to the establishment of 5771 sites providing accommodation to many families. The current inhabitant will be incorporated in the housing scheme.

Table 8-12: Socio-economic_Land Use

Impact on Land Use	
Description	Land reserved as right of way
Status	positive
Extent	Local
Duration	Long Term
Intensity	High
Probability	Definite
cumulative	Compounding
Significant before mitigation measures	Definite
Significant after mitigation measures	Low

8.2.10 Issue: Regional Economy and Employment

i.Description

There will be short term employment and business opportunities for the local residents and businesses during the construction phase. The strategy to be adopted when employing should be in line with and guided by the objectives and policies of Government. The contractor shall be encouraged to hire local residents and sub contractors whenever possible. The supply of adequate housing will also promote the proliferation of businesses.

Table 8-13: Socio-Economic_Economy and Employment

Regional Economy and Employment	
Description	Employment of local residents and businesses during construction
Status	Positive
Extent	Local
Duration	Long term
intensity	Medium
Probability	Definite
cumulative	Compounding

8.2.11 Issue: Infrastructure Framework: transportation

i. Description

The use of the road network will play a large role in delivering materials and resources to the construction camp during construction. An increase in traffic volumes is expected to be minimal and short term, during the construction period. The roads that will be used for access include the N11. The construction of internal access streets will result in vegetation clearance and ultimately soil erosion.

Table 8-14: Socio-Economic Infrastructure

Impact on Infrastructure	
Description	The use of infrastructure during construction
Status	Negative
Extent	Site
Duration	Short
intensity	Medium
Probability	Definite
cumulative	Compounding
Significant before mitigation measures	Definite
Significant after mitigation measures	Low

ii.***Mitigation***

- Any temporary access road required for this project will be removed upon completion of construction unless otherwise requested by the landowner.

8.3 SUMMARY OF IMPACTS

Table 8-15: Impact Summary and Significance Ratings

ISSUE / IMPACT	Extent	Duration	Intensity	Probability	Significance	Status	Confidence
Habitat transformation	S	L	M	M	L	-	H
Vegetation Clearance	S	S	L/M	H	L	-	H
Introduction of Alien Species	S	L	L	H	L	-	H
Hydrological	S	L	L-M	H	L	-	M
Soil	S	S	H	H	L	--	H
Air Quality	S	S	M	H	L	-	H
Visual -Landscape	L	H	L	D	L	N	H
Noise	L	S	L	D	L	N	H
Archaeological	S	S	L	M	L	-	M
Waste generation	S	S	M	D	L	N	H
Land Use	L	L	H	D	L	-	H
Regional Economy and Employment	L	L	M	D		+	H
Infrastructure Framework	S	S	M	D	L	-	H

Spatial Extent	S=Site Specific	L=Local	R=Regional	N=National
Duration	T=Temporary	S=Short Term	M=Med. Term	L=Long
Term	P=Permanent			
Magnitude	L=Low	M=Medium	H=High	
Probability	I=Improbable	M=Medium	H=Highly	D=Definite
Significance	N=None	L=Low	M=Medium	H=High
Status	N=Neutral	+ = Positive	- = Negative	
Confidence	L=Low	M=Medium	H=High	

8.4 NO-GO ALTERNATIVE

The potential negative impacts associated with the proposed township establishment are mostly associated with biophysical aspects. In the event that the township is not constructed, proliferation of informal settlements will continue leading to the degradation of the wetland. Socio-economic benefits that include job creation will not be realized and the local economy will not improve if the project is not implemented. The proposed township establishment is meant to provide adequate well serviced housing to the municipal area residents.

SECTION 9: CONCLUSION AND RECOMMENDATIONS

9.1 EAP's OPINION

The environmental impact assessment carried out on the establishment of Ermelo Township on Portion 6 of Farm Rietspruit 437IS has clearly shown that the proposed project will have negative environmental impacts. All biophysical and socio-economic impacts were assessed for the project area and the following conclusions and recommendations were made;

a. No major significant negative impacts were identified during the environmental impact assessment;
b. According to the specialist studies carried out on site, the township establishment is favoured over the NO-GO alternative.
c. The project will also have positive impacts such as adequate housing, employment during the construction phase and will encourage the growth and emergence of small businesses during the operation phase.

The implementation of the mitigation measures outlined in the EMPr (**attached as Appendix K)**, will lessen the significance of the identified impacts. As a result, the positive environmental impacts will outweigh the negative environmental impacts. The EAP therefore recommends that the project be approved and that the mitigation measures be included in the Environmental Authorisation.

9.2 CONCLUSION

Key socio-economic and biophysical impacts expected from the construction and operation of the proposed township includes:

(i) *Change in Physical and Chemical Characteristics of Water bodies:* the proposed township will be located close to the river, and construction and operation activities can result in the contamination and sedimentation of the water bodies. A 100m buffer should be placed from the edge of the temporary zone;
(ii) Poor waste management practices may result in the pollution of the river. The impact is therefore rated **MEDIUM.**
(iii) Disturbance associated with construction activities may lead to the introduction of alien species, the impact will be **MEDIUM.**
(iv) *Destruction to vegetation.* The impact is considered to be of **LOW-MEDIUM** significance.

(v) Approximately 78 graves were identified on different section of the proposed area. Thus, the possibility of finding other graves is **HIGH;**

(vi) The impact on palaeontology is **VERY LOW.** Paleontological materials are known to preserve well in ancient dunes. There was no indication, or signs of dunes on the site.

(vii) The cumulative impacts activities associated with the township along with the existing impacts will cumulative be low**.**

(viii) *Cumulative Economic Impacts:* the construction of the township will result in an increase in employment opportunities during the construction phase and the proliferation of businesses.

(ix) The residual impact is expected to be **MEDIUM** if the mitigation measures are put in place.

9.3 RECOMMENDATIONS

The following recommendations must be included within the authorisation issued;

- The stipulations and provisions of the attached Environmental Management Programme on **Appendix K** be conveyed to and familiarised by the contractor and workers responsible for construction;
- Permits required by the developer from other competent authorities should be acquired before the commencement of the activity;
- A 100m buffer should be placed from the edge of the river;
- A waste management collection system must be established and the waste must be disposed of at a licensed facility;
- Formal demarcation design of the drainage lines must incorporate the placement of culverts in relevant places, and maintain the natural drainage;
- Adequate erosion controls should be implemented when removing vegetation;
- No construction vehicles must be allowed to work within 100m of any stream;
- The applicant is reminded to take precautions during construction of the proposed project, should any archaic material be unearthed, construction should be halted immediately and SAHRA be notified.

SECTION 10: REFERENCES

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- **Vhubvo Archaeo-Heritage Consultants cc. 2011.** *Heritage Investigation for the township establishment at Ermelo on Portion 6 of Farm Rietspruit 437IS within Msukaligwa Local Municipality, Mpumalanga Province.* VAHC.Makwarela

APPENDIX A

EAP'S CV

CURRICULAM VITAE OF RASILINGWANI LIVHUWANI

Specialties	Environmental Impact Assessment, Geographic Information Systems, Natural Resources Management Project Management, Public Participation	
Personal Details	• **Date of Birth:** 09 July 1983 • **Nationality :** South Africa • **Languages:** English	
Contact Details	Business Mailing Address: Dynamic Integrated Geo-Environmental Services Private Bag 5743, Polokwane North, 0750	• Cell: 073 429 6888 • Tel: +27(0)15 291 4151 (Bus) • Fax: +27(0)15 291 4167 (Bus) • E-mail: livhuwanir@diges.co.za
Qualifications	**BSc Environmental Science,** University of Venda, 2008 **Certificate: GIS certificate ,** University of Venda, 2010	
Career history	2010-Present: DIGES-Environmental Impact Assessment Officer	
Project Experience	**Borrow Pit s** • Borrow Pit Application for Upgrading of gravel road from Praktiseer to Taung village within Greater Tubatse Local Municipality. • Borrow Pit Application for construction of chicken houses at Midway chix **Chicken Houses** • EMP and Basic Assessment for the construction of chicken houses at Midway chix	

	Roads • Environmental monitoring for road upgrading from Polokwane to Matlala village within Aganang local Municipality Capricorn District, Limpopo Province (18 months). **Public Participation** • Township establishment at Ermelo within Msukaligwa Local Municipality. • Township establishment at Bonwana village within Greater Giyani Local Municipality. • Construction of a 132kv kingbird power-line between existing Amandla and Kwaggafontein substation within Elias Motsaeledi local municipality of Sekhukhune district and Thembisile Hani Local Municipality of Nkangala District Municipality • Proposed Construction of a power line and a substation within Mutale Local Municipality. • Proposed construction of an access bridge at Molawetsi within Greater Tubatse Local Municipality. • Proposed construction of a sports ground at Mapodile within Greater Tubatse Local Municipality. • Proposed expansion of Seshego cemetery at Seshego within Polokwane Local Municipality

APPENDIX B

DEDET ACKNOWLEDGEMENT LETTER

APPENDIX C

MAPS

APPENDIX C-1

LOCALITY MAP

APPENDIX C-2

AERIAL PHOTOGRAPH

APPENDIX D

LAYOUT PLAN

APPENDIX E

SITE PHOTOS

Power line crossing the site

Graves on site

Two existing houses on site

Un-rehabilitated borrow pit

Western view of the site

Rocky outcrop on the eastern side of the site

APPENDIX F

SERVICES LETTER

APPENDIX G

PUBLIC PARTICIPATION

APPENDIX G-1

PROOF OF SUBMISSION

APPENDIX G-2

I & AP

Stakeholders

Names	Department	Contact details	Postal Address
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Mr. Dube D	Department of Human settlement	Tel: 013 766 6233 Fax: 013 766 8430 Email: apohl@mpg.gov.za	No. 7 Government Boulevard Building No. 6 & 7 Riverside Park Extension 2 Nelspruit 1200
Mr. Makhubu	Msukaligwa municipality Ward 9 councilor	Cell: 082 709 6385 Fax: 017 819 4017	
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Mr Dan Hlenyane	Gert Sibande district	Cell: 082 904 0736 tsunkeh@gmail.com	Gert Sibande District Municipality P.O.Box 550 Secunda 2302

APPENDIX G-3

NEWSPAPER ADVERT

APPENDIX H

ENGINEERING SERVICES REPORT

APPENDIX I

HERITAGE REPORT

APPENDIX J

GEOTECHNICAL REPORT

APPENDIX K

ENVIRONMENTAL MANAGEMENT PROGRAMME