

**DRAFT
Environmental Impact Assessment
REPORT**

for the proposed
**Township Establishment on Portion 3, Riekerts Laager
165JR, Dr. J.S. Moroka Local Municipality**

DEDET Ref No: 17/2/3N-331

July 2014

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EXECUTIVE SUMMARY

The Nkangala District Municipality has appointed the Environmental Assessment Practitioner (EAP), Afrika Enviro & Biology to obtain authorization in terms of Chapter 5 of the National Environmental Management Act (Act 107 of 1998) in order to proceed with the residential development on Portion 3 of Riekerts Laager 165JR in the Dr. J.S. Moroka Local Municipality. The application for authorization has been acknowledged by the competent authority (Mpumalanga Department of Economic Development, Environment and Tourism).

The proposed development site is located on Portion 3 of Riekerts Laager 165JR. Central site coordinates are: S25°09'47.3"; E28°49'44.6". The property is located in the Dr. J.S. Moroka Local Municipality and is approximately 1161Ha in size of which 70Ha will be used to formalize an existing residential township and provide new serviced stands. The objective of the project is to formalize the existing residential dwellings and provide services to improve living conditions of the residents. New houses will be provided in the central eastern section with roads, and Municipal services. Approximately 500 stands will be supplied (including the existing stands). The proposed land uses are: residential = 481, business = 8, Institutional = 10 (churches - 6 and crèches - 4) municipality = 4 erven and public open space = 4. The access road to the site will be on D-1944 road connecting to R568 road. There will be proposed 13m roads providing direct access to the erven. Due to the location of the site near adjacent to the existing Vaalbank Township (Appendix A-1), municipal services is already available on site and will be upgraded to include the additional demand.

All relevant Authorities as well as the general public and surrounding landowners - was notified and invited to participate in the EIA process. Issues and concerns was identified through a process of consultation with the proponent and then with relevant authorities and interested & affected parties and stakeholders. Specialist investigations are included in order to identify potential impacts but also to determine the best alternatives for the project.

During the EIA process all potential environmental impacts have been identified and assessed. Alternatives related to technological and site conditions were considered upon review of the specialist reports and the impact assessment. The EAP did not find any detrimental environmental impacts that cannot be adequately controlled or mitigated to reduce their magnitude to acceptable levels and all issues have been adequately addressed and resolved. The EAP therefore recommends a positive final decision on authorization of the activity. Conditions that should be considered by the competent authority and may be required for authorization are given in the environmental impact statement as well as the Environmental Management Programme.

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1. INTRODUCTION

The Nkangala District Municipality has appointed the Environmental Assessment Practitioner (EAP), Afrika Enviro & Biology to obtain authorization in terms of Chapter 5 of the National Environmental Management Act (Act 107 of 1998) in order to proceed with the residential development on Portion 3 of Rieker's Laager 165JR in the Dr. J.S. Moroka Local Municipality. The application for authorization has been acknowledged by the competent authority (Mpumalanga Department of Economic Development, Environment and Tourism); (Appendix D-1) and the EIA process is conducted under the amended EIA regulations and activities listings as published in Government Notices No.'s 543-547 of June 18, 2010.

This document presents the results of the Draft Environmental Impact Assessment process as required by the EIA regulations. The document also outlines the methodology and results of the tasks performed by the consultant in order to prepare the Final Environmental Impact Assessment Report (EIAR). The Draft EIAR aims to provide information to stakeholders regarding to – and addresses the environmental issues and potential impacts identified related to the proposed development. This provide the regulating authority with sufficient information for the decision making process.

2. THE ENVIRONMENTAL PRACTITIONER (EAP)

Afrika Enviro & Biology (Environmental and biodiversity consultants) is the appointed EAP and conducted the EIA process for this project. This company has been practicing in environmental services since 2005 and the leading agent allocated to this project has the following expertise:

Danie van der Walt: M.Sc. Natural Sciences and has successfully completed EIA and SHEQ accredited courses as well as several accredited ecological, wetland and biodiversity orientated courses.

The contact details of the EAP are as follows:

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3. PROJECT DESCRIPTION

3.1 Particulars of Proponent

Name: Nkangala District Municipality
 Contact Person: Mr. Boetie Mathe,
 Address: PO Box 437, Middelburg, 1050

3.2 Description of proposed activity

The proposed development site is located on Portion 3 of Rieker's Laager 165JR. Central site coordinates are: S25°09'47.3"; E28°49'44.6". The property is located in the Dr. J.S. Moroka Local Municipality and is approximately 1161Ha in size of which 70Ha will be used to formalize an existing residential township and provide new serviced stands. The objective of the project is to formalize the existing residential dwellings and provide services to improve living conditions of the residents. New houses will be provided in the central eastern section with roads, and Municipal services. Approximately 500 stands will be supplied (including the existing stands). The proposed land uses are: residential = 481, business = 8, Institutional = 10 (churches - 6 and crèches - 4) municipality = 4 erven and public open space = 4. The access road to the site will be on D-1944 road connecting to R568 road. There will be proposed 13m roads providing direct access to the erven (The townplanning process motivation is included in Appendix F). Due to the location of the site near adjacent to the existing Vaalbank Township (Appendix A-1), municipal services is already available on site and will be upgraded to include the additional demand. The conceptual layout (Appendix A-2) proposes the final layout. This development will entail several activities listed in the EIA Regulations (2010) as published in Government Notices No.'s 544 and 545:

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Describe each listed activity as per the detailed project description (and not as per wording of the relevant Government Notice) ¹ :
No. R.544 June 18 2010	9	The construction of infrastructure exceeding 1000m in length for the bulk transportation of water, sewage and storm water with an internal diameter of 0.36m or more and a peak throughput of 120L/second or more.
No. R.544 June 18 2010	22(i)	The construction of roads, outside urban areas, with a reserve wider than 13.5 metres.
No. R.544 June 18 2010	26	The property is located in an area identified by the Mpumalanga Biodiversity Conservation Plan as a sensitive area and therefore Section 53 of the National Environmental Management Biodiversity Act is applicable.
No. R.545 June 18 2010	15	The proposed development is 70Ha in size and will transform more than 20Ha of vacant land.
No. R.546 June 18 2010	4(ii)	The construction of roads wider than 4m outside an urban area in a sensitive biodiversity management area.
No. R.546 June 18 2010	13(a)	The clearance of more than 1ha of indigenous vegetation within a critical biodiversity area and ecological support area.
No. R.546 June 18 2010	13(c)ii(ff)	The clearance of more than 1ha of indigenous vegetation outside urban areas within 5km of a protected area.
No. R.546 June 18 2010	14(a)i	The clearance of more than 5ha of indigenous vegetation outside an urban area.

The operational phase will consist of buildings and infrastructure which will be built to the guidelines of the Municipality and the South African National Building Regulations.

4. SITE AND LOCAL ENVIRONMENTAL CONDITIONS

4.1 Description of the property

The property is located adjacent (to the west) of the existing Vaalbank Township in the Dr. J.S. Moroka Local Municipality and is approximately 1160Ha in size of which 70Ha is relevant to this project. The majority of the site has already been transformed by informal housing in historic times (Appendix C). However, naturally vegetated areas and riparian areas are located on the western section (Appendix C). The Mkhombo Nature Reserve and Renosterkop Dam conservation area is located directly to the northwest of the site.

4.2 Description of the environment

4.2.1 Topography and biodiversity

Nationally, the site is situated within the Mixed Bushveld (A18) veld type according to Acocks (1988), and Mixed Bushveld according to Low & Rebelo (1998). However, these classifications are very broad and may include several vegetation communities of importance. Regionally, the more accurate vegetation classification system of Mucina & Rutherford (2006) is used to classify the vegetation unit occurring at the study site. According to these authors the vegetation unit present on this property is classified as Central Sandy Bushveld (SVcb 12). This vegetation unit is found at an altitude of 850-1450m. Central Sandy Bushveld is rated as Vulnerable and only 3% is conserved (Doorndraai Dam and Skuinsdraai Nature Reserves) according to Mucina & Rutherford, 2006. Approximately 19% has been transformed due to cultivation and 4% due to urbanization. Large areas are also heavily populated by informal settlements. The Mkhombo Nature Reserve and Renosterkop Dam conservation area is located to the northwest.

According to the Mpumalanga Biodiversity Conservation Plan (MBCP), the site is located in an area zoned primarily as *No natural habitat remaining*, as well as small areas zoned as *Highly significant* and the site is also subject to the LN3 listing and located within 5km of a protected area (Appendix A-3). A biodiversity assessment was conducted to determine the site status (Appendix E-3) which found that the development will not encroach onto the LN3 areas.

4.2.2 Climate

Seasonal summer-rainfall and very dry winters. Summer rainfall (MAP: 500-700mm) and mean monthly temperatures vary from -3.1°C in winter to 35.5°C during the summer. The winters can produce cold spells but the occurrence of frost is infrequent.

4.2.3 Geology and soils

The southern and eastern areas are underlain by granite of the Lebowa Granite Suite. In the north sedimentary rocks of the Waterberg Group are most important. Rock formations are dominated by sandstone, conglomerate, siltstone and shale. Soils vary from deep Hutton to Clovelly and shallow Glenrosa soil types. A geotechnical investigation was conducted to determine the site status (Appendix E-1) which found that there are no constraints that will affect the development layout.

4.2.4 Water resources

No natural surface water or streams and watercourses are located inside of the development area. Two drainage lines are present on the extreme western area. The drainage areas and riparian zones will be investigated as part of the biodiversity assessment. There are no known boreholes on site. The presence of areas with shallow water tables, if present, will be identified by a geotechnical report.

4.2.5 Cultural and heritage importance

A heritage impact assessment was conducted to determine the site status (Appendix E-2) which found that the development will not encroach onto the LN3 areas.

4.2.6 Socio-economic environment

The Local Municipality is experiencing economic development inputs and intends to upgrade the provision of houses and services. The proposed development can be viewed as critical for the development cycle the local region as it will:

- Create infrastructure to lure investment to the region;
- Address the need for residential growth.

It is envisaged that the proposed development will have only positive social and economic impacts for the local area as it will provide formal housing with municipal services.

5. THE EIA PROCESS AND RELEVANT LEGISLATION

Section 24 of the National Environmental Management Act (1998) requires that 'activities that require authorization or permission by law which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.' The EIA process is the tool used to apply for authorization from the regulating authority for the relevant activities identified that may impact on the environment.

5.1 Chronology of the EIA process

The regulating authority for this project is the Mpumalanga Department of Economic Development, Environment and Tourism (DEDET), Directorate Environmental Impact Management. DEDET is commissioned to do the final decision making and authorization for this EIA application. The process is followed strictly according to the regulations as published in the Environmental Impact Assessment Regulations (2010). After the application for an EIA have been submitted, the application was acknowledged by DEDET and a reference number was allocated that is used during the whole process for administration purposes (Appendix D-1).

The Scoping Process entails the pre- environmental impact screening – project description and evaluation of the project and its alternatives – and is aimed to address the following:

- Description of the project;
- Identification and description of alternatives;
- Identification of relevant legislation and authorities;

- Site and environment descriptions;
- Notification and participation of public and interested and affected parties;
- Identification and description of potential environmental issues and impacts;
- Identification and need of specialist studies to evaluate potential impacts;
- Plan of study for the EIA process and tasks to be performed.

The Scoping Document also outlines the methodology of the tasks to be performed by the consultant in order to prepare the Environmental Impact Assessment Report. The Scoping Document is distributed to all I&AP's as well as the authorities for review and comment before commencement of the actual Environmental Impact Assessment.

The EIA process entails all the criteria of the Scoping process but importantly, also includes the assessment of impacts as well as a draft Environmental Management Plan (EMP). The EIA report aims to conclude all possible issues and to recommend the best possible alternative and activity to be authorized as well as recommending measures and activities to ensure the least impact on the environment.

A draft EIAR is distributed to all I&AP's as well as the authorities for review and comment before the final EIAR (addressing all comments and issues received from the I&AP's) is submitted to the regulating authority for review. These issues can then be addressed and responded to in the final EIA report. The final EIA report aims to conclude all possible issues and to recommend the best possible alternative and activity to be authorized as well as recommending measures and activities to ensure the least impact on the environment.

5.2 Relevant Legislation

Legislation and guidelines that are being considered for the EIA process are as follows:

- Constitution of the Republic of South Africa (No 108 of 1996)
- National Environmental Management Act (No 107 of 1998)
- National Environmental Management: Waste Act (No 59 of 2008)
- National Environmental Management: Air Quality Act.
- National Environmental Management: Biodiversity Act (No 10 of 2004)
- National Environmental Management: Protected Areas Act (No 31 of 2004)
- Environmental Conservation Act (No 73 of 1989)
- National Water Act (No 36 of 1998)
- Conservation of Agricultural Resources Act (No 43 of 1983)
- National Heritage Resources Act (No 25 of 1999)
- Occupational Health and Safety Act (No 85 of 1993)
- Promotion of Access to Information Act (2000)
- National Roads Act (No. 7. 1998)
- EIA regulations and guidelines (2010)
- All relevant Provincial regulations and Municipal bylaws

5.3 Authorities Consultation

Consultation with DEDET will include the following process:

- Submission of an application for authorization of the activities in terms of section 24 of the National Environmental Management Act of 1998;
- Consultations with the appointed DEDET official (Ms. Okwethu Fakude);
- A site inspection was undertaken with the relevant DEDET official on March 06, 2014 in order to familiarize her with the site conditions (Appendix D-1).
- Submission of the Scoping Report and plan of study for EIA.
- Completing tasks for compiling the EIA report and submission of the Draft EIA Report for review;
- Submission of the Final EIA Report for approval.

The following authorities and major stakeholders have also been consulted/informed of the project and provided with background information and/or the Draft EIA report:

- Dr. J.S. Moroka Local Municipality and Nkangala District Municipality;
- The Town Council;
- Mpumalanga Parks and Tourism Agency.

6. PUBLIC PARTICIPATION PROCESS

A public participation process was followed in accordance of the EIA regulations (2010). This process was executed as elaborated in the following section and is recorded in Appendix D.

6.1 Identification and notification of Interested & Affected Parties

After acknowledgement with a reference number was received from DEDET (Appendix D-1) the public participation process was followed as stipulated by the present EIA regulations as published in 2010.

An EIA notice was prepared for distribution and copies were placed at strategic places on site (Appendix D-2) and published in the regional newspaper (*Mpumalanga News*, January 09, 2014) so as to ensure maximum exposure to all the potential interested and affected parties (Appendix D-2).

All possible Interested & Affected parties was identified and afforded an opportunity to participate and comment on the proposed development. Contact was made with adjacent property owners and key interested & affected parties. After the I&AP's and relevant authorities were identified they were informed of the EIA process and invited to participate. This was done through electronic mail and hand deliveries. Consultations and discussions were held with I&AP's and stakeholders during visits. Records of notifications and the I&AP and stakeholder register are included with Appendix D-3.

The Draft EIA Report was completed according to the EIA regulations and distributed to the I&AP's as well as DEDET. Written comments and feedback received from the I&AP's and stakeholders up to date is included with Appendix D-4.

6.2 Issues & Concerns

Issues and concerns was identified through a process of consultation with the proponent and then with relevant authorities and interested & affected parties and stakeholders. Proven methods were used during these consultations, which included checklists, matrices, and networks and map overlays. No issues or concerns were raised to date as result to the PPP. Potential issues are discussed below.

The presence of sensitive biodiversity may provide an issue that need be addressed. Therefore a biodiversity Assessment was conducted to verify the site status. The findings and recommendations are summarized in section 9 and the report is included with Appendix E-3. The findings indicate that the proposed development area does not encroach onto any sensitive ecological areas or ecosystems. Furthermore, the nearby Mkhondo Nature Reserve will not be physically affected and it must be taken into account that this township has been present on this site for many years without any negative impacts on the Reserve.

7. NEED & DESIRABILITY

In order to assess the 'need and desirability' alternatives of the project the following documents relevant to these two aspects that were consulted (1): Dr. J.S. Moroka Local Municipality: Integrated Development Planning (IDP), 2011-2016, (2): Draft guideline on the information requirements to describe need and desirability in the EIA process (DEAT, 2008). The townplanning process motivation is included in Appendix F. In the following sections this EAP attempts to make an objective assessment of the "need and desirability" of the project and makes a recommendation based on the available documents and information:

This land is already zoned for residential development according to the SDF. In recent years, the Municipality has continued to develop the local area for township establishment as result of the demand for housing. This project can be motivated as a logical extension of the Vaalbank Township to the east. Services infrastructure is available on site and will be upgraded to service the additional stands. The proposed project will not require additional capacity of the municipal services than were planned for. It can thus be concluded that the development will not compromise the integrity of the SDF as agreed upon by the environmental authority.

Conclusion

The following relevant points can be made upon the following aspects with consideration of the abovementioned information:

The "need" for the project:

- 1) The land use (associated with the activity being applied for) is located in a developing zone of the Municipality and can be considered to be within the timeframe intended by the existing approved (IDP).
- 2) The project is planned at a time and place in a developing sector of the town and can be considered to be a natural opportunity associated with the growth of the town.

- 3) The activity will render a service to the local community and will create employment opportunities.
- 4) All the necessary services and appropriate capacity required by the proposed activity is currently available and no additional capacity has to be created to cater for the development.
- 5) This development has already been approved by the Local Municipality and is provided for in the infrastructure planning of the municipality.

The “**desirability**” of the project:

- 1) As the site is located in an “expansion zone”, the approval of this application would not compromise the integrity of the existing approved IDP as agreed to by the relevant environmental authority. The project has therefore also been approved by the Municipality.
- 2) The approval of this application would not compromise the integrity of the existing environmental management priorities for the area.
- 3) The location factors favour this land-use (associated with the activity applied for) as it is located in the correct zone as required by the municipal planning as well as the fact that the location is situated within a developing residential orientated area with much potential for growth.
- 4) The activity and the land use associated with the activity applied for will not impact on sensitive natural and cultural areas.
- 5) The operation will be designed, constructed and operated according to the required standards set by the authorities and should not impact on people’s health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc).
- 6) It is not anticipated that the activity will result in unacceptable opportunity costs as it will be integrated with the existing residential suburb in the local area.

It can thus be concluded that there is a positive need and desirability for the development - if no undesirable or unmanageable environmental impacts are identified which suggest that the activity and the site alternatives are undesirable/unsuitable and/or pose a risk to the local environment or resident people.

8. ALTERNATIVES

As discussed in section 7, there is an existing need and desirability for the development on the proposed (preferred) land. There is no alternative land available in the immediate area that will meet these criteria and furthermore, local residents have indicated that the proposed land must be developed as it is nearby their present node of activities, and families. The preferred site and preferred activity is thus motivated as the only alternatives evaluated for the application. The townplanning process motivation is included in Appendix F.

The no-go alternative is the option not to go ahead with the development. As it has already been indicated that there is a need and desirability for the proposed

development locally, it is anticipated that this development will add to the development potential and economic growth of the region. The no-go alternative will only be considered as an alternative if it is concluded that the preferred alternative will have significant negative impacts on the environment which cannot be reduced or managed to an acceptable level.

The development will trust on both proven as well as the latest approved materials and technologies for building, services and engineering purposes. Standard designs required for environmental compliance and safety requirements will be used and specialist recommendations will also be considered to produce the best alternative final design and layout. As such no substandard materials or technologies will be considered for the proposed activities.

Additional aspects that contributed to the selection of alternatives and recommendations that were considered during the EIA process were:

- Geotechnical considerations and recommendations
- Engineering considerations and recommendations
- Heritage Impact Assessment (HIA) results and recommendations
- Biodiversity
- Authorities conditions and guidelines

9. SPECIALIST REPORTS AND RECOMMENDATIONS

Alternatives related to site conditions and technology is considered upon review of the specialist reports. The specialist reports were studied and summarized and recommendations and alternatives that are included with these reports were considered during the impact assessment. Specialist maps, drawings and designs are included with Appendix A). The specialist inputs are summarized in the sections below.

9.1 Geotechnical Investigation (Appendix E-1)

This geotechnical investigation was done for the purpose of township establishment and was conducted in accordance with the standards of the GFSH-2 Generic Specification of the National Department of Housing. The objectives of the investigation were to:

- Establish the site stratigraphy and the engineering properties thereof,
- Identify potential problem soils,
- Establish a preliminary geotechnical zoning of the site for planning and foundation design purposes.

In summary:

The site is underlain by bedrock comprising Nebo Granite of the Bushveld Igneous Complex as indicated by the regional geological map. The bedrock is covered by a thick deposit of Quaternary age colluvium and alluvium as indicated by the map and in consequence only one shallow occurrence of granite bedrock could be reliably confirmed during the investigation. A zone of potentially collapsible and compressible sandy transported soil (colluvium) mantles the site and occurs to depths that are

generally between 1,0 and 1,5 m, but also up to 2,8 m depth in minor areas of the site.

A significant portion of the site contains ferricrete directly below the sandy colluvium and the ferricrete is considered to have developed within the colluvium. Much of the site contains a layer of sandy gravel and boulders that occur below the colluvium as well as the ferricrete. This layer begins at depths of 1,0 m to 2,8 m and whilst the lowermost extent of this material could not be reached at most occurrences, it was found to be underlain by sandy soil that is suspected to be residual granite. Bedrock was encountered at shallow depth in only one test pit and is considered to be generally deeper than 3,0 m deep.

Ground water seepage was encountered in only four test pits at depths ranging from 1,2 m at the northeastern end of the site and from 2,5 m to 2,7 m at the northwestern boundary of the site. Signs of temporary perched water tables occur over parts of the site in the form of ferricrete in the soil profile. It is concluded that water ingress into excavations shallower than 1,5 m in general should not normally occur but that temporary perched water tables are possible after prolonged rain in the wet season on top of the ferricrete layers, particularly in the vicinity of the northeastern border.

General conclusions

The general conclusions in the main body of this report regarding the geotechnical aspects of the site as it affects the development are as follows:

- There are no prohibitive geotechnical constraints on development of the site as a whole. Careful consideration of founding methods are required due to the presence of high collapse potential and high soil compressibility. There is no potential heave discernable problem at the site.
- Four options including soil improvement below foundation level to prevent excessive settlement due to collapse potential and compressibility are discussed in this report. They include two methods of soil improvement below foundations, concrete raft foundations and inverted I-beam foundations.
- Possible shallow cut to fill operations to make level building platforms are expected to produce variation in subsurface stiffness in the southern parts of the site, which can result in differential settlements. These issues are also addressed in the report.
- The available in situ materials are expected to meet only the requirements for lower selected layer or subgrade and not improved soil (soil mattresses) below foundations. Suitable material as specified in the report will have to be brought to site. If the in situ material is to be used as soil mattress material some differential settlement of foundations should be expected with consequent crack damage.
- It is emphasized in the report that further and more detailed (Phase 2 at the construction stage) investigation as per the GFSH-2 specification will be required to satisfy NHBRC requirements for the enrolment of individual homes in their warranty scheme. This aspect is discussed in some detail in the report.
- High rise structures will require separate detailed investigation. Neither this investigation nor further investigation to satisfy the NHBRC requirements, specifically a Phase 2 investigation for refinement of the geotechnical zoning will provide adequate information for foundation design for high rise structures.

9.3 Heritage Impact Assessment (Appendix E-2)

A Heritage Impact Assessment (HIA) was conducted in order to identify possible sites of significance. The HIA did not record any heritage sites that will be affected by the development.

9.4 Biodiversity Assessment (Appendix A and E-3)

The Provincial Data Base (Mpumalanga Biodiversity Conservation Plan) indicates that small sections of the land are classified as sensitive subject to LN3 EIA listing, necessitating a Biodiversity Assessment to verify the ecological status of the site.

Site description

The majority of the site has already been transformed by informal housing. However, naturally vegetated areas and riparian areas are located on the western section. The central eastern section as well as the immediate surrounds of the site consists of degraded woodland. Wood harvesting and overgrazing by cattle are the main negative impacts in these areas. The Mkhombo Nature Reserve and Renosterkop Dam conservation area is located directly to the northwest of the site. No RDL species or endemic species were recorded. No protected species were recorded on the development area.

Recommendations

The biodiversity assessment concludes that the proposed development site is of *Low* biodiversity and sensitivity value and can be recommended for development. Taking into consideration the transformed site status and the absence of sensitive/important species on site, it is not anticipated that it will have a negative impact on maintenance biodiversity or the surrounding area that is Protected or subject to LN3 classification. The following recommendations are site specific:

- Development areas must be planned to make use of already disturbed areas with a *Low* sensitivity rating;
- The recommended development areas consist of the degraded and transformed land;
- Conserve the riparian zone.

The layout must be planned to accommodate the following:

- Conserve natural communities and minimize loss of individuals and diversity;
- Conserve important species and individuals (i.e. Red Data Listed and legally protected spp.);
- Conserve large solitary indigenous trees on the total site area;

Additionally, the following measures must be included with the management plan:

- Use only indigenous flora for landscaping;
- Replace exotic trees with suitable indigenous species;
- Implement an alien invader plant control program;
- Topsoil must be protected and stabilized.

10. IMPACT ASSESSMENT

10.1 Methodology

So as to evaluate impacts objectively and assign an order of priority for individual impacts, it is necessary to identify the following characteristics of each impact:

- The *nature* of the impact entails a description of the cause of the impact, what will be affected and how it will be affected;
- The *extent* refers to the area where the impact will be significant e.g. on site, local area, regional, provincial, national or international;
- The *duration* refers to the lifetime of the impact. The time frames used in this assessment are as follows:
 - Short term: 0-5 years
 - Medium term: 5-15 years
 - Long term: >15 years
 - Permanent
- The *probability* describes the likelihood of the impact occurring during the duration:
 - Improbable (Low likelihood)
 - Probable (Distinct possibility)
 - Highly Probable (Most likely)
 - Definite (Impact to occur regardless of any preventative measures)
- The *significance* is determined by analyzing the above subjects and is assessed as low, medium or high.
- The *status* indicates whether the impact is positive, negative or neutral.

10.2 Assessment of potential environmental impacts

During the basic EIA process the following potential environmental impacts and/or aspects were identified in a chronological order of the development phases:

Planning phase

- Land use
- Geology and Topography
- Availability of services
- Increased motorized traffic
- Heritage sites
- Water resources
- Ecology & biodiversity

Construction phase

- Generation of noise, dust and vibrations
- Generation of spoil material and waste
- Traffic and Neighborhood disruptions
- Visual impact
- Construction camp, discipline and materials stockpiles
- Pollution and spillages of hazardous substances

Operational phase

- Impact on wetlands
- Availability of services and waste management
- Increased motorized traffic

- Visual impacts
- Impacts on neighbouring land including protected areas
- Social and economic impacts for the local area

The potential impacts are discussed in a chronological order as far as possible in the following section and are also summarized in section 8.3. Overlapping impacts – or impacts present during more than one phase of the development process are indicated in the assessment tables below.

Land use

The site is already zoned for residential use according to the Municipal planning. No negative impacts are expected in this regard.

Impact/Aspect	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Change of land use	Site	Long term	Definite	Low	Low

Geology & Topography

The topography of the site is flat with a gentle north easterly sloping convex to concave slopes towards the main natural drainage line. There are no steep slopes, perched areas or rocky outcrops present on site. The geotechnical report recommends that the site is suitable for development (Appendix E-2). No negative impacts are anticipated with regards to the geology and topography as long as the specialist recommendations are followed.

Impact/Aspect	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Topography	Local	Long term	Unlikely	Low	Low
Geology	Local	Long term	Unlikely	Low	Low

Impact on municipal of services

Municipal services are already available on site and will be upgraded to include the additional demand. No negative impacts are anticipated.

Impact/Aspect	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Availability of services	Local	Operational	Unlikely	High	Low

Water resources

Pollution of water resources can occur during construction and operational phases. However, no surface water or boreholes are present on site and any pollution potential can be regarded as low.

Impact/Aspect	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Water pollution	Local Downstream	Short term	Unlikely	Low	Low

Ecology and biodiversity

The development will result in a minimal loss of natural habitat and vegetation as the habitat and biodiversity report indicates that the ecosystems on site is transformed

and degraded as result of human induced impacts (Appendix E-3). No LN3 areas or Protected areas will be directly affected. Anticipated impacts after mitigation are low.

Impact/Aspect	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Loss of Fauna	Site	Long term	Definite	Low	Low
Loss of Flora	Site	Long term	Definite	Low	Low
Loss of Habitats	Site	Long term	Definite	Low	Low

Heritage sites

No heritage sites were identified on site and the recommendations of the HIA will be adhered to if any relevant sites/material becomes are discovered (Appendix E-2).

Impact/Aspect	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Heritage sites	Site	Long term	Probable	Medium	Low

Construction camp, workforce discipline and materials stockpiles

An inadequately planned construction camp and stockpiles depot may result in pollution, littering and noise. The construction camp and sanitation facilities for labor will be concentrated on a nearby existing site where infrastructure and essentials such as water, waste collection and sanitation is already available. An undisciplined and badly managed workforce will have a negative affect on the neighboring landowners. A construction management plan will be adhered to so as to prevent related impacts. These issues are addressed in the Draft EMP (Appendix G). The potential significance of this impact is rated as low.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Littering & pollution	Site	Short term	Probable	Medium	Low
Safety/Injury	Site	Short term	Probable	Medium	Low
Discipline	Local	Short term	Probable	Medium	Low
Waste management	Site	Short term	Probable	Medium	Low

Generation of noise, dust and vibrations during construction

Noise and dust will be generated during construction. Appropriate measures will be emplaced to minimize this impact. These issues are addressed in the Draft EMP (Appendix G). The potential significance of this impact is rated as low.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Noise	Site	Construction	Definite	Medium	Low
Dust	Site	Construction	Definite	Medium	Low
Vibrations	Site	Construction	Definite	Medium	Low

Topsoil and erosion

Construction activities can result in the loss of topsoil and erosion. Measures must be in place to protect soil during the construction and operational phases. These issues are addressed in the Draft EMP (Appendix G). The potential significance of this impact is rated as low.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Erosion	Site	Short term	Probable	Medium	Low
Pollution of soil	Site	Long term	Probable	Medium	Low
Loss of topsoil	Site	Long term	Probable	Medium	Low

Storm water management

Inadequate storm water management can result in the loss of topsoil and erosion as well as flooding of residential areas. Measures must be in place to protect soil during the construction and operational phases. These issues are addressed in the Draft EMP (Appendix G). The potential significance of this impact is rated as low.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Erosion	Site	Short term	Probable	Medium	Low
Loss of topsoil	Site	Long term	Probable	Medium	Low
Flooding	Site	Long term	Probable	Medium	Low

Visual and aesthetic impacts

During construction the site may be untidy and unused items and spoil materials as well as stockpile areas may not be visually attractive. However, this will be of a temporary nature to attain the operational phase. No negative long term visual or aesthetic impacts are foreseen as the final product will be a well designed residential suburb forming an integral part of the local area. The potential significance of this impact is rated as low.

Impact	Extent	Duration/Phase	Probability	Significance Before Mitigation	Significance After Mitigation
Visual	Site	Short term	Definite	Medium	Low
Aesthetic	Site	Long term	Definite	Medium	Low

Generation of spoil material and waste during construction

Spoil material and solid waste will be generated during construction. Most of the material will be used as filling material. Disposal of domestic waste and building rubble will be done at a permitted site. The potential significance of this impact is rated as low.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Spoil & waste	Site	Construction	Definite	Medium	Low

Traffic and Neighborhood disruptions during construction

During construction, vehicles and detours may result in traffic disruptions. Appropriate measures will be employed to minimize this impact. The potential significance of this impact is rated as low.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Traffic disruptions	Site	Construction	Definite	Medium	Low

Motorized traffic and access during operational phase

During the operational phase there will be an increase in traffic from the existing Newtown access roads. The municipality will address this issue with additional planning of the main roads in the general area. The potential significance of this impact is rated as low if sufficient planning is conducted.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Increased traffic	Site	Operational	Definite	Medium	Low

Environmental pollution & waste management

Pollution and waste disposal may occur during the construction phase. Strict precautions must be taken to prevent sources of pollution and the generated waste and refuse will require efficient waste management. Refuse bins should be conveniently located, and effort should be made to keep paper, plastic and bio-degradable materials separate for recycling. A services agreement is in place with the Municipality and it is unlikely that these impacts will be relevant during the operational phase. With these measures in place the potential significance of this impact is rated as low.

Impact	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Environmental pollution	Site Local	Short term	Probable	Medium	Low
Waste management	Site Local	Short term	Probable	Medium	Low

Impacts on neighbouring land

It is not envisaged that the development will have negative impacts on neighbouring land uses and nearby Protected areas. No objections from neighbouring IAPs or land owners were received to date and it is not anticipated that the Protected area will be negatively affected.

Impact/Aspect	Extent	Duration	Probability	Significance Before Mitigation	Significance After Mitigation
Neighbouring land owners/uses	Local	Construction Operational	Probable	Medium	Low
Protected areas	Local	Long term	Unlikely	Medium	Low

Social and economic impacts for the local area

It is anticipated that the development will have only positive impacts to the local society and community mostly as result of additional housing and improved services infrastructure. The use of local labor will have significant positive impact for labor in the local community.

Impact	Extent	Duration	Probability	Significance	Status
Socio-Economic	Local	Construction Operational	Definite	Medium	Positive

10.3 Impact assessment table

The impacts assessed in the previous section are summarized in Table 2.

Table 2 Impact Assessment Table for the proposed phases of development

Phase	Nature of Impact	Extent	Duration	Intensity/ Severity	Probability/ Certainty	Significance	
						Before mitigation	After mitigation
Planning	Geology & Topography	Site	Long term	Low	Unlikely	Low	Low
	Land use	Site	Long term	Low	Definite	Low	Low
	Availability of services	Local	Long term	High	Unlikely	High	Low
	Heritage sites	Site	Long term	Medium	Probable	High	Low
	Ecology & biodiversity	Site	Long term	Low	Unlikely	Low	Low
	Protected areas	Site	Long term	High	Unlikely	Low	Low
Construction	Surface & groundwater	Site	Short term	Medium	Unlikely	Medium	Low
	Generation of noise, dust and vibrations	Site	Short term	Medium	Definite	Low	Low
	Generation of spoil material and construction waste	Site	Short term	Low	Definite	Medium	Low
	Traffic & neighborhood disruptions	Local	Short term	Low	Definite	Medium	Low
	Construction camp, discipline & materials stockpiles	Local	Short term	Low	Probable	Medium	Low
	Pollution and waste management	Site	Short term	Medium	Probable	Medium	Low
	Visual	Site	Short term	Medium	Probable	Medium	Low
	Topsoil & erosion	Site	Short term	Medium	Probable	Medium	Low
	Storm water management	Site	Short term	Medium	Probable	Low	Site
Operational	Visual	Local	Long term	Low	Unlikely	Low	Low
	Traffic Impact	Local	Long term	Low	Unlikely	Medium	Low
	Availability of services and waste management	Local	Long term	High	Unlikely	High	Low
	Management of wetlands	Local	Long term	High	Probable	High	Low
	Impact on neighbouring land use	Local	Long term	High	Probable	Medium	Low
	Social & Economic Impacts	Local	Short term	Medium	Definite	Status positive	High
	Impact on municipal services	Local	Long term	High	Unlikely	High	Low

11. STATEMENTS

11.1 Assumptions and uncertainties

No uncertainties or assumptions were made during the assessment. However, the EAP trusted on the integrity and professional opinions of the specialists, officials and public that was consulted during the process.

11.2 Professional opinion

The EIA process indicates that the proposed land-use will not result in unacceptable cumulative impacts. Furthermore, no undesirable or unmanageable environmental impacts were identified which suggest that the activity and the site alternatives are undesirable/unsuitable and/or pose a risk to the local environment or resident people.

The EAP therefore recommends a positive final decision on authorization of the activity. Conditions that should be considered by the competent authority and may be required for authorization are given in the following section as well as the draft environmental management programme (Appendix G).

11.3 Environmental impact statement

The assessment exercise, input from specialists, comments from relevant authorities and interested parties concludes that the site can be used for the proposed purpose, with the necessary mitigation measures in place, and provided the management recommendations outlined in this report are implemented.

An environmental impact statement is included as Table 3 and presents a summary of the key findings and a comparative assessment of positive and negative implications of the proposed activity as well as alternatives and relevant mitigation measures where appropriate. The EIA also serves as the basis of the Environmental Management Programme (EMP) which is formulated to manage and mitigate the magnitude of environmental impacts (Appendix G).

Table 3 Environmental Impact Statement and impact mitigation Table for the proposed activities

Phase	Impact	Mitigation	Significance	
			Before	After mitigation
P L A N N I N G & C O N S T R U C T I O N	Loss of biodiversity during construction	<ul style="list-style-type: none"> ▪ Conserve indigenous vegetation wherever possible. ▪ Re-vegetate disturbed areas with indigenous species. 	Low	Low
	Impact on Protected areas	<ul style="list-style-type: none"> ▪ Conserve the Protected areas and protect it from surrounding impacts. 	High	Low
	Impacts related to geotechnical conditions	<ul style="list-style-type: none"> ▪ Follow the alternatives and recommendations of the geotechnical report. 	Medium	Low
	Impacts on surface and ground water resources	<ul style="list-style-type: none"> ▪ Construction camp, facilities and material must be located away from water resources and courses. ▪ Pollution and wastage of water must be prevented. ▪ Hazardous materials must be handled and disposed of correctly. ▪ Monitor construction water consumption. ▪ Set up emergency response mechanisms in advent of pollution. ▪ Vehicle movement must be limited to demarcated areas. 	Low	Low
	Land disturbance due to construction activities	<ul style="list-style-type: none"> ▪ Excavation activities to be confined to the area to be developed (footprint) as per planning and should be done to achieve desired outcome. ▪ Limit activities to disturbed areas. ▪ There must be no other land excavation, besides those stipulated for construction purposes. ▪ Ensure that the site is cleaned and that rehabilitation of affected areas is undertaken. 	Low	Low
	Impact on topsoil and soil erosion	<ul style="list-style-type: none"> ▪ Vegetation removal must be limited to construction sites only. ▪ Pollution and loss of topsoil must be prevented. ▪ Topsoil must be removed prior to construction must be stockpiled and protected for later use. ▪ Prevent and address soil erosion. ▪ Prevent silting of watercourses by use of silt traps and re-vegetation of disturbed areas. 	Low	Low
	Generation of dust	<ul style="list-style-type: none"> ▪ Use dust-suppressing agents. ▪ Limit vehicle speed. ▪ Avoid dust generating activities during strong winds. 	Low	Low
	Noise pollution and vibrations generated by construction equipment	<ul style="list-style-type: none"> ▪ Construction activities recommended to operate Mon – Friday 8hrs per day. No work is to be done on Sundays and public holidays. ▪ All equipment must be in good working order and must be serviced regularly. ▪ Any noise generating equipment used near residential areas must be encased. 	Low	Low
	Spillage, stockpiles and other construction related activities	<ul style="list-style-type: none"> ▪ Construction camp and stockpiling is to be confined within the existing construction camp and storage area. ▪ Concrete mixing will be done on pre-designed slabs underlined by PVC lining, on an area previously disturbed. Alternatively, maintain one mixing site and transport the concrete to the construction site. ▪ Any concrete, fuel or chemical spillage must be contained and cleaned immediately. ▪ All construction material must be sourced off-site from commercial sources. 	Medium	Low
	Traffic disruptions	<ul style="list-style-type: none"> ▪ Provide clear signage on detours and other deviation routes, where necessary. 	Low	Low
Heritage sites	<ul style="list-style-type: none"> ▪ Protect known heritage sites and adhere to the HIA recommendations. 	Medium	Low	

	Work force management (litter, ablution facilities, safety etc.).	<ul style="list-style-type: none"> ▪ Site manager to educate construction workers on pollution control and other related matters. ▪ Litter bins to be provided ▪ Adequate ablution facilities are to be provided. The contractor is to ensure that chemical toilets are provided on site if necessary and are regularly maintained. The contract workers will not be allowed to use the bush for these purposes. ▪ Construction workers are to use protective clothing where necessary. 	Medium	Low
O P E R A T I O N A L	Provision of services	<ul style="list-style-type: none"> ▪ Services agreement has been reached with the Municipality and will be implemented as such 	Low	Low
	Storm water & Drainage	<ul style="list-style-type: none"> ▪ Maintain storm water infrastructure in good operational order. 	High	Low
	Protected areas	<ul style="list-style-type: none"> ▪ Protect and improve these areas. 		
	Safety & Fire	<ul style="list-style-type: none"> ▪ Adhere to Municipal standards 	Medium	Low
	Aesthetic	<ul style="list-style-type: none"> ▪ Building designs and township management to be according to Municipal standards. 	Medium	Low
	Waste management	<ul style="list-style-type: none"> ▪ Ensure that waste management on site is properly conducted at all times. 	Medium	Low
	Traffic	<ul style="list-style-type: none"> ▪ Ensure that good road surfaces are maintained and that traffic signs are in place and adhered to. 	Medium	Low
	Water and soil	<ul style="list-style-type: none"> ▪ Prevent pollution, wastage and loss of these resources. 	High	Low
A D D I T I O N A L R E C O M M E N D A T I O N S	Socio-economic impact	<ul style="list-style-type: none"> ▪ This project will improve living conditions and provide housing to poor people and will improve the socio economic environment for nearby residents in informal settlements. ▪ The proposed project is likely to create employment opportunities to skilled and unskilled labour. 	N/A	N/A
	Final Design	<ul style="list-style-type: none"> ▪ All relevant codes of practice and SABS Codes must be adhered to in the construction and operation of the activity. Final designs should consider the safety and accessibility of people, surface, slope and storm water channel should be adjusted accordingly. 	N/A	N/A

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